The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXIV. No. 607 FEBRUARY 14, 1931 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0

Contents

	PAGE
EDITORIAL: British Industries Fair; Fair Play For Gas: Economy at Last	135
Midland Chemists Dinner	137
British Industries Fair, 1931: Notes on Chemical Exhibits	138
Application of Silver to Chemical Plant, by Donald McDonald	142
Phosphates and Superphosphates	145
Chemical Advances in 1930	146
From Week to Week	147
Patent Literature	148
Chemical Market Reports	150
Company News	152
Commercial Intelligence	154
DYESTUFFS MONTHLY SUPPLEMENT: Dyes and Dyeing, Technical Progress in 1930, by L. J. Hooley; Basic Intermediates for Dyestuffs No. XL: Derivatives of the Anthraquinone Series—Part 3, by "Consultant"; New Application of Aqueous Pastes to Dyes	7—12

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

The British Industries Fair

THE British Industries Fairs of 1931 will open simultaneously in London (Olympia) and Birmingham (Castle Bromwich) on Monday next and will remain open until the end of the following week. The Chemical Section, in accordance with the arrangement from the beginning, will be included in the London Fair and will again be in the general care of the Association of British Chemical Manufacturers. At the Birmingham Fair, however, there will be a large group of exhibits which, though not specifically chemical, are closely associated with chemical processes and industries. There will thus be a representative display of plant and products of direct and indirect interest to all makers, users, and distributors of chemicals.

In this issue we publish advance notes on the chemical products to be exhibited at Olympia. These include the usual range of heavy chemicals, by-products, fine chemicals, dyestuffs, solvents, placticisers, analytical, and newer types of chemicals. The range is wider than on any previous occasion, growing with the growth of the industry, though the number of individual exhibitors may be fewer. This is partly explained by the size and comprehensive character of such an exhibit as that of Imperial Chemical Industries, which itself represents almost every aspect of industrial chemistry. The exhibiting firms, it should be noted, are all manufacturers with works in Great Britain. Prices, in conformity with the world level, will show a considerable reduction in many directions, while ever-increasing technical control and improved processes and plant materials have resulted in still higher standards of purity. In next week's issue we hope to publish another instalment of notes, together with an account of many of the products shown at Birmingham.

The continuation of the Fair over a considerable period of years testifies to the commercial belief in the need of systematic publicity. The competition between nations for the world's trade has made it imperative to go out into the highways and byways in search of custom. British products of every class one can think of still stand supreme in the matter of quality but their makers have come to realise that it is not fair to even the best of goods to expect them to sell themselves, and that it is no function of the customer to hunt out the product he wants but the duty of the producer to put its claims before him. This simply means that the quality of our goods themselves must be equalled by the quality of the salesmanship and distributive methods behind them. Thus the idea of periodical fairs, like that of regular press advertising, has come to be accepted as a necessary part of commercial organisation.

The great British Empire Trade Exhibition, to be opened in Buenos Aires the following month by the Prince of Wales, is only an application or extension of the same principle. There a definite campaign has been undertaken to capture for British business firms a larger share of Argentine trade, and the articles we shall presently be publishing from our special representative, Mr. John Benn, will show the extent of the opportunities to be found in South America. Mr. Benn, by the way, with Mrs. Benn, reached New York last week-end and has already entered on the extensive business tour planned for him. It may be worth while to remind those who are intending to visit the Argentine in connection with the Exhibition that the weather in Buenos Aires at this time of the year is generally comparable to English summer weather. The vaccination regulations usually enforced will be waived for visitors to the Exhibition travelling first and second class or by tourist ship. Special arrangements have been made by the Exhibition authorities to enable the introduction free of duty of samples and propaganda materials and literature, provided these are intended solely for use or distribution at the Exhibition. Further details of these arrangements can be obtained at the London office of the Exhibition: 5, Parliament Mansions, Victoria Street, London. Advance hotel bookings, we understand, are already heavy and intending visitors are advised to make the necessary arrangements in this connection as early as possible.

Fair Play for Gas

SIR DAVID MILNE-WATSON'S protest against the policy of certain municipal authorities of prohibiting their tenants from using gas for any purpose, and particularly against the action of the Minister of Transport in "boosting" electricity at the expense of gas, is a piece of public service for which he will be warmly thanked. Everyone recognises, of course, the need of cheaper electricity for all kinds of purposes, and no one objects to legitimate efforts to extend and popularise its use. What is objected to is the attempt to compel its substitution for gas and to inflict a damaging and unfair blow on an industry, which is already under very strict regulations as to its service to the public, in which an enormous amount of capital has been invested, and any restriction of which would seriously add to the total of unemployment.

The whole business indicates the new school of statesmanship, which sees only one thing and one object at a time, and which, in its eagerness to reach it, overlooks the damage it may do in half a dozen different directions. "Sixpennyworth of good and a shillingsworth of harm" as Huxley once wrote. Apart from what the gas industry has done to provide for lighting, cooking, heating, and power—in some of which it is still held to be superior to electricity—it has rendered a national service of which these high-handed authorities, together with the Transport Minister, seem to be completely ignorant. To the gas industry we are indebted mainly for our knowledge of the chemistry of coal and for the development of its by-products. This work was undertaken by the gas undertakings before the State or municipal authorities had ever thought about it, and as was pointed out in the dyestuffs case, effective research of this kind is only possible through the medium of a living industry. But the present Government seem determined to demonstrate their ignorance of the meaning, at least, of chemical research. As the Rt. Hon. Tom Shaw told his staff at the Admiralty: "I tell them if they want research, let them pay for it." That was merely stupid. The action of municipal authorities in attempting to prohibit gas for domestic use—whether lighting, heating or cooking—is a grave invasion of the rights of gas undertakings, a serious restriction of the rights of the consumer, and a very dangerous principle and precedent to introduce in public administration.

Economy at Last!

MR. SNOWDEN'S speech in the House of Commons on Wednesday shows that at last even the Government has realised the national necessity of economy, and his statement may be regarded as the first definite effect of the national economy campaign recently opened so auspiciously in the Cannon Street Hotel. The connection between the two events is obvious. Lord Grey, in his statesmanlike opening speech, laid down one broad principle. In future, he claimed, the Government and everybody else would have to consider not merely whether proposals were in themselves desirable, but primarily whether the country could afford them. Mr. Snowden now declares for the same principle in plain words: "Schemes involving heavy expenditure, however desirable, will have to wait until prosperity returns." Into the details of Mr. Snowden's speech there is no need to enter. It has been described as the gravest speech made by a Chancellor of the Exchequer for fifty years. The chief interest for the moment is that the truth about national economy is forcing itself on even the political mind.

Books Received

SOME PERSONS UNKNOWN. By Henry T. F. Rhodes. London: John Murray. Pp. 268. 6s.

ECONOMIC CONDITIONS IN THE BRITISH WEST INDIES. By J. L. Wilson Goode. London: H.M. Stationery Office. Pp. 94. 2s. 6d.

THE MICROSCOPIC EXAMINATION OF CATTLE FOODS. By S. T. Parkinson and W. L. Fielding. London: Headley Brothers. Pp. 98. 6s. 6d.

A TRIBUTE TO MICHAEL FARADAY. By Rollo Appleyard. London: Constable and Co., Ltd. Pp. 204. 7s. 6d.

A SURVEY OF THE MINERAL POSITION OF THE BRITISH EMPIRE. Imperial Institute Mineral Resources Department. London: H.M. Stationery Office. Pp. 121. 2s.

The Calendar

Feb.		
16	University of Birmingham Chemical Society: "Synthesis of Certain Colouring Matters of Flowers." Professor R. Robinson. 5.30 p.m.	University, Birmingham.
16–21	British Artificial Silk Goods Exhibition.	Royal Albert Hall, London.
16–27	British Industries Fair. 9.30 a.m. to 7.30 p.m.	Olympia and White City, London.
	Birmingham Section	Castle Bromwich, Birmingham.
17	Royal Institution: "The Sizes of Atoms." Sir William Bragg. 5.15 p.m.	21, Albemarle Street, London
17	Newcastle Chemical Industry Club: "A Holiday in the Austrian Tyrol." G. B. Howarth. 7.30 p.m.	Newcastle.
18	Society of Glass Technology	Sheffield.
18	Society of Dyers and Colourists (Midlands Section): "Function of the Bradford Conditioning House." E. H. Townsend. 7.30 p.m.	Leicester Technical College.
19	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
19	Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections): "Lithographic Processes and Problems." C. Parkinson. 8 p.m.	North British Station Hotel, Edinburgh.
19	Institute of Fuel. Joint Meeting with the Society of Chemical Industry. "The Petrographic Treatment of Coal: The Mechanical Separation of Coal into its Constituents and their Commercial Applications." John L. Strevens. 7 p.m.	University College, Nottingham.
20	Society of Chemical Industry (Newcastle Section): "Some Aspects of the Carbonisation of Coal." S. Roy Illingworth. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
20	Society of Chemical Industry (Liverpool Section): "Modern Developments in Printing." Leonard Wild. 6 p.m.	University, Liverpool.
20	Physical Society. 5 p.m.	Imperial College of Science, London.
20	Society of Dyers and Colourists (Manchester Section): "Solazol Dyestuffs." J. S. Wilson. 7 p.m.	36, George Street, Manchester.
21	Finsbury Technical College Old Students' Association: Annual Dinner.	Trocadero Restaurant, London.
25	Society of Dyers and Colourists (Midlands Section): 7.30 p.m.	University College, Nottingham.
25	Institute of Chemistry (Belfast Section): "Effects of Air Humidity on Cellulose." J. A. Matthew. 7.30 p.m.	Royal Belfast Academical Institution.

Midland Chemists' Dinner

Views on the Charter Proposals

THE annual dinner and dance held by the Birmingham and Midland Branches of the Society of Chemical Industry, the Institute of Chemistry and the British Association of Chemists took place on Saturday evening at the Midland Hotel, Birmingham. The attendance, which was representative of Midland chemists, numbered 130, and late applications for tickets had to be refused owing to the limited accommodation. Mr. W. A. S. Calder, chairman last year of the Birmingham and Midland Section of the Society of Chemical Industry, presided, and the guests included Dr. G. C. Clayton (President of the Institute of Chemistry) and Dr. C. S. Garland, representing the two other societies. Among others present were Dr. E. D. Mason (chairman, Midland Section S.C.I.), Mr. W. R. Barclay and Mr. A. W. Knapp (vice-chairman), Professor Ling (Biological Chemistry Department, Birmingham University) and Drs. C. A. Fox, Wardlaw, W. M. Hampton, Carter, Brownsdon, and Duff, Mr. F. R. O'Shaughnessy, Mr. A. A. King, Mr. W. T. Colliss (hon. treasurer), Mr. George King (hon. secretary), Mr. A. V. Rheade (chief chemist, Birmingham Gas Department)

Conditions in Germany

The toast of " The Profession of Chemistry " was proposed by Mr. Garland, who pointed out that chemistry as a profession was, like most businesses of the country, passing through a very difficult time. He had just returned from Berlin and there he learned that things were a good deal worse in Germany and in other parts of the Continent than they were here. In his opinion there was, however, no cause for pessimism. " We know there are better times coming," said Mr. Garland, " and we know that the future of the world depends upon chemists."

Already the chemist, to a very large extent, clothed the people, and it seemed to him that he was well on the way to feeding them. He was confident that within the next 50 or 60 years the development of bacteriological chemistry would have an enormous effect upon the problems that faced them. Mr. Garland referred to the petition of the Institute of Chemistry asking the Privy Council for an amendment of its charter to enable its members to be described as " Chartered Chemists " to distinguish them from Pharmaceutical Chemists. His hope was that if the petition were granted unfairness would not be caused to other members of the profession of Chemistry who were not members of the Institute. They had to be careful not to create among chemists classes of sheep and goats. In conclusion, he paid tribute to the scientific achievements of Dr. Clayton and the valued service he rendered in the House of Commons in being able to discuss with authority any scientific matters of national concern that might arise.

The Value of the Chemist

Dr. Clayton, in acknowledging the toast, said he had supported the idea of the Institute that they should obtain a charter for chemists. Included in the profession of chemistry was a large variety of interests—professors at the Universities heads of chemical firms, research chemists, works chemists and consulting analytical chemists. All had had the advantage of a scientific education, and were able to follow intelligently the course of research and the inventions that were made. There was always a chance of a chemist bringing out some new invention or novelty, and that was specially the case with the research chemist. His life was one long education. It was so largely experimental in order to discover new reaction to new processes; and furthermore he was in the happy position, of helping to find out the secrets of nature. It was not, in fact, until recently that the public had learned to appreciate the value of the chemist, and the government were to be congratulated upon showing this recognition by conferring a peerage upon the President of the Royal Society. The fact that that social gathering was held under the joint auspices of three societies augured well for the future, for no one realised more than he the importance of such co-operation for the interests of chemistry as a whole.

The toast " Our Guests " was proposed by Dr. Mason, and Mr. Calder replied.

Dr. Paul Krische

German Librarian's Notable Record

THE accompanying photograph is of Dr. Paul Krische, who, on March 6, 1931, will have acted for 25 years in the capacity of chief librarian of the German Potash Syndicate, Berlin, and editor of the fortnightly illustrated agricultural journal *Die Ernahrung der Pflanze*. Dr. Krische was born in Göttingen on May 1, 1878. After the completion of his studies at the local university and a considerable amount of travelling abroad, he acted during 1904-1906 as assistant in the Agricultural Experimental Station at Köslin. Since 1906 he has filled the dual post referred to above.

Dr. Krische is the author of a series of works relating to agricultural chemistry, the potash industry, and soil science, a selection of which is given below: 1904: Wie Studiert man Chemie? 2 Aufl., 1919 (How is Chemistry Studied? Second Edition, 1919); 1905: Agrikulturchemische Untersuchungsmethoden, russ. 1911, 2 Aufl., 1928; 1906: Das Agrikulturchemische Kontrollwesen; 1908: Verwertung des Kalis in Industrie und Landwirtschaft (Utilisation of Potash in Industry and Agriculture); 1910: Abschnitte aus dem Kalijahrbuch (Extracts from the Potash Year Book); 1911: Agrikulturchemie (Teubner), 1. Aufl., 1921 (Agricultural Chemistry (Teubner), Second Edition, 1921); 1916: Kalisalzdungung (Potash Manuring); 1921: Die landw. Hauptbodenarten Deutschlands (The Main Agricultural Soil Types of Germany); 1923: Kali (Potash); 1929: Bodenkarten (Soil Maps).

Die Ernahrung der Pflanze is one of the best-known technical publications dealing with agricultural chemistry and soil science. It not only contains illustrated reports on agricultural, horticultural, and forestry manurial experiments and plant physiology investigations, but, through the initiative of Dr. Krische, it specialises in the publication of such subjects as the improvement of quality of produce by manuring, the combating of plant diseases by manuring, pictorial representation of farming practices both at home and abroad, soil maps, agricultural statistics and agricultural history. This publication is available for agricultural research stations and agricultural institutes of all kinds. As editor of this journal for 25 years, Dr. Krische has done much to promote and disseminate the results of original investigations in the field of crop production.

Institute of Chemistry Pass List

THE following is the pass list for the January Examination (1931) of the Institute of Chemistry:—

Examination in General Chemistry for the Associateship: Boundy, Clifford Kenneth, Central Technical School, Liverpool, and College of Technology, Manchester; Clark, George Charles Harry, West Ham Municipal College; Edwards, Aubrey Harris, trained under S. R. Illingworth, D.Sc., F.I.C.; France, Horace Vernon, Technical College, Huddersfield; Gresham, Harold Ernest, B.Sc. (Lond.), Technical College, Derby; Jasperson, Harold, B.Sc. (Lond.), Central Technical School, Liverpool; Jones, Frederick Arthur, B.Sc. (Lond.), Technical College, Birmingham; Keelty, Joseph Vincent, Technical College, Leeds; Purser, Ernest Granville, B.Sc. (Lond.), Battersea Polytechnic, and Chelsea Polytechnic, London; Radley, Jack Augustus, B.Sc. (Lond.), trained under R. P. Page, F.I.C.; Rampton, Harry Cecil, B.Sc. (Lond.), Chelsea Polytechnic, London; Watts, John Thomas, B.Sc. (Lond.), Loughborough College, Leicester; White, Bertram, B.Sc. (Lond), Technical College, Birmingham; Woodhall, William, B.Sc. (Lond.), Wigan and District Mining and Technical College, and Sir John Cass Technical Institute, London.

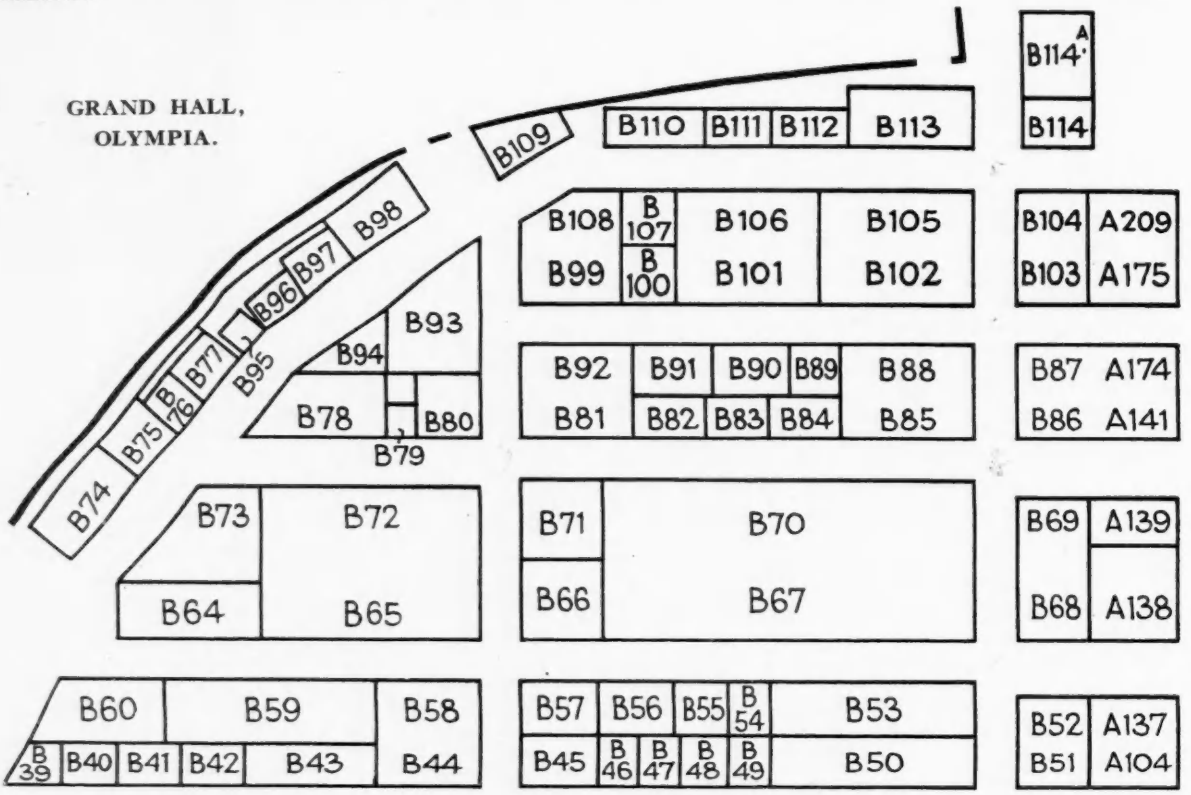
British Industries Fair of 1931

Preliminary Notes on Chemical Exhibits

THE British Industries Fair of 1931 will be opened simultaneously in London and Birmingham on Monday next, February 16, and will continue open until Friday, February 27.

The Chemical Section will, as usual, be included in the London Fair at Olympia, while the constructional, engineering and other heavy industries will be represented in the Birmingham Section.

We give below a plan of the Chemical Section, at Olympia, London, which will occupy some 11,000 square feet on the ground floor of the Grand Hall, together with an alphabetical list of the names, addresses and stand numbers of the various exhibitors.



Name	Address	Stand No.
Acetate Products Corporation, Ltd.	Pontifex House, Shoe Lane, London	B.59
Albright and Wilson, Ltd.	Oldbury, near Birmingham	B.101; B.106
Frederick Allen and Sons (Poplar), Ltd.	Phœnix Chemical Works, Upper North Street, London	B.111
H. E. Ashdown (Birmingham), Ltd.	Aldridge Road, Perry Barr, Birmingham	B.54
Association of British Chemical Manufacturers	166, Piccadilly, London	B.90
Bakelite, Ltd.	68, Victoria Street, London	B.50
Beatl Sales, Ltd.	49, Wellington Street, London	B.53
Beetle Products Co., Ltd.	Popes Lane, Oldbury, Worcestershire	B.53
Bellchambers Glass Bottle Co., Ltd.	199, Piccadilly, London	B.39
A. Boake Roberts and Co., Ltd.	Carpenters Road, Stratford, London	B.102; B.105
British Drug Houses, Ltd.	Graham Street, City Road, London	B.85; B.88
British Industrial Solvents, Ltd.	Kinnaird House, Pall Mall East, London	B.114
British Plastic Moulding Trade Association	19–23, Ludgate Hill, London	B.54
W. J. Bush and Co., Ltd.	Ash Grove, Hackney, London	A.141; A.174; B.86; B.87
F. C. Calvert and Co., Ltd.	P.O. Box 147, Manchester	B.110
County Chemical Co., Ltd.	"Chemico" Works, Bradford Street, Birmingham	B.74
T. B. Ford, Ltd.	Snakeley Mills, Loudwater, High Wycombe, Bucks	B.66
Gas Light and Coke Co.	Dauntsey House, Frederick's Place, Old Jewry, London	B.103; B.104
General Chemical and Pharmaceutical Co., Ltd.	Judex Works, Sudbury, Middlesex	B.89
Graesser-Monsanto Chemical Works, Ltd.	Victoria Station House, Victoria Street, London	B.54
Hopkin and Williams, Ltd.	16-17, Cross Street, Hatton Garden, London	A.139
Howards and Sons, Ltd.	Ilford, London	A.138
F. Hulse and Co., Ltd.	Woodlesford, nr. Leeds	B.97
Imperial Chemical Industries, Ltd.	Imperial Chemical House, London	B.67; B.70
Insulators, Ltd.	Derby Road Works, Montague Road, Edmonton, London	B.54
Johnson and Sons Manufacturing Chemists, Ltd.	Hendon Way, Hendon, London	B.71
Kanis, A. W.	66, Aldersgate Street, London	B.43

Kaputine (General) Syndicate, Ltd.	Lilley St., Queen's Road, Manchester B.99; B.108
Kelacoma, Ltd.	Broadwater Road, Welwyn Garden City, Herts B.45
Lawes' Chemical Manure Co., Ltd.	Creeksmouth, Barking, Essex B.112
May and Baker, Ltd.	Battersea, London A.175; A.209
Thomas Morson and Son, Ltd.	47, Gray's Inn Road, London B.91
National Titanium Pigments, Ltd.	Adelaide House, King William Street, London B.79
Reeves and Sons, Ltd.	Ashwin Street, Dalston, London B.107
St. Albans Moulding Co., Ltd.	Sphere Works, St. Albans, Herts B.48
South Metropolitan Gas Co.	709, Old Kent Road, London B.68; B.69
Spencer Chapman and Messel, Ltd.	Walsingham House, Seething Lane, London B.83
Francis Shaw and Co., Ltd.	Corbett Street Ironworks, Bradford, Manchester ... B.47
Staniform, Ltd.	London B.82
Streetly Manufacturing Co., Ltd.	Aldridge Road, Streetly, near Birmingham B.53
Thos. Tyrer and Co., Ltd.	Stirling Chemical Works, Stratford, London B.113
United Chemists' Association, Ltd.	"Ucal" Works, Cheltenham B.81; B.92
United Ebonite Manufacturers, Ltd.	Chadwell Works, Grove Road, Chadwell Heath B.56
Viscose Development Co., Ltd.	Woldham Road, Bromley, Kent B.109
Whiffen and Sons, Ltd.	Carnwath Road, Fulham, London A.104; A.137
Williams (Hounslow), Ltd.	Hounslow, Middlesex B.51; B.52

Notes on the Chemical Section

THE products of British chemical manufacturers were, in the opinion of many, seen to greater advantage at Olympia last year than in any year since the war. The Chemical Section in 1931, will, it is expected, eclipse even last year's exhibit and afford still more convincing proof of the outstanding scientific and utilitarian achievements of the industry. The Chemical Section will again be housed on the Ground Foor in the Grand Hall at Olympia, close to the Druggists' Sundries Section, and will include the usual wide range of products.

The arrangements for the Chemical Section will be as usual under the auspices of the Association of British Chemical Manufacturers and the Section will afford powerful inducements for a visit by all interested in chemicals for either research or commercial application. The Association will have an office in the Section to deal with any inquiries that visitors may wish to make, and overseas buyers may rely on the best information being obtained for their purpose; the main office of the Association is at 166, Piccadilly, London, W.1, from which full information may be obtained on any point. The 1931 edition of the Association's main Directory will be available, and should make a special appeal to overseas buyers, as it is in six languages, *viz.*, English, French, German Italian, Portuguese and Spanish. The Association's other Directory of British Fine Chemicals contains a list of over 3,000 different fine chemicals and their makers, and affords striking evidence of the progress of this key industry, which is of vital importance to every other industry, without exception, since fine chemicals, even if they are not used directly in manufacture, are essential for analytical control.

The following descriptions of the individual exhibits will serve to indicate the very close connection between chemistry and the necessities and luxuries of modern life.

The exhibits will cover all branches of chemistry including heavy chemicals, fertilisers, explosives, coal tar derivatives, fine chemicals of all kinds, medicinal, pharmaceutical, photographic, perfumery and analytical chemicals, solvents, plasticisers and dyestuffs. Prices, in conformity with the world level, will be lower than ever and the unceasing technical control has resulted in still higher standards of purity.

It should be added that the following account of the various stands in the Chemical Section has been supplied by the courtesy of the Association of British Chemical Manufacturers.

Albright and Wilson, Ltd.

This firm, well known as manufacturers of phosphorus and its compounds, will be showing their usual comprehensive display of phosphorus and its derivatives, including technical and pure phosphoric acid, phosphorus oxychloride and phosphorus trichloride, sodium, and calcium phosphates for the baking and milling trades, ammonium phosphate and magnesium ammonium phosphate, together with special preparations of a very high standard of purity, including phosphoric acid B.P., carbon tetrachloride commercial (99·97 per cent.) and medicinal, precipitated sulphur, hypophosphites and sodium glycerophosphates.

The display of silicon ester, which has become such a feature of the firm's exhibit, will again be seen. This substance is becoming widely used as a stone preservative, but the use which is attracting increasing attention is as a paint medium for use on concrete, asbestos cement sheeting, and lime-containing surfaces, which will not take oil paints satisfactorily.

A. Boake Roberts and Co., Ltd.

This well-known firm is endeavouring to exhibit the full range of their technical and fine chemicals. There will be in all about 700 samples on the stand, and members of their technical and scientific staff will be present in order that all possible information concerning their products shall be available to those interested.

A complete range of fine chemicals, essential oils, terpeneless oils and intermediates will be shown as indicating the avenue along which these products have been developed. There will be a display of perfumes and perfume bases for use in scents, soap, bath salts, creams, brilliantines, disinfectant sprays, etc.; and materials for covering the odours of oils, fats, polishes, etc.

The firm's technical chemicals will be represented by liquid sulphur dioxide in glass syphons, tins and iron cylinders; sulphites, hyposulphites, bisulphites and metabisulphites; phosphates; saponites; sulphonated oils.

The firm does a considerable business in solvents, placticisers, gums and resins and a wide variety of these products will be on show which will be of interest in connection with the preparation of cellulose nitrate and cellulose acetate lacquers, plastics and moulded products and also to the paint, varnish and printing ink trades.

Driers and metallic soaps will be represented by metallic oleates, stearates, linoleates, tungates, palmitates, and resinates. These are guaranteed to contain a definite metal content, and can be supplied both in the fused and the precipitated form.

Many products will be shown this year for the first time, particularly fine chemicals, plasticisers and metallic soaps, in each of which groups the firm has been carrying out research work during the past year, and the results of which will be exemplified by the products shown at the Fair.

The British Drug Houses, Ltd.

Whilst there is no reflection in the British Drug Houses laboratories by the manufacture on a commercial scale of any outstanding discovery in 1930, such as was the case, for example, when Insulin "A.B." or when irradiated ergosterol was discovered, or when it was found that pernicious anæmia could be cured by liver treatment, nevertheless, there is evidence of real progress along certain lines. The introduction of a highly antiseptic product of the nature of Quinanil is worthy of note. Quinanil is an anilquinoline derivative of extraordinarily high bactericidal value and correspondingly low toxicity.

Other new products of note are the B.D.H. Ergot preparations—Ergodex and Ergotoxine Phosphate. Ergodex is a purified miscible extract of the official ergot of rye; it contains the whole of the alkaloidal content of the drug, and is standardised physiologically to contain 0·03 per cent. of ergotoxine. Ergodex possesses all the characteristic activity of ergot of rye. The specific alkaloid Ergotoxine is also

prepared in the B.D.H. laboratories and is issued for medical use in the form of its phosphate, which is the particular alkaloidal salt employed by the Pharmaceutical Society as a standard for ergot preparations. Ergotoxine Phosphate B.D.H. is also standardised physiologically, and both products can be relied upon for efficacy and for uniformity in action.

Vitamins are still the subject of absorbing interest. The discovery of Carotene is of interest. There is scientific evidence to show that Carotene is related to the anti-infective and growth-promoting Vitamin A found in green vegtables, egg yolk and butter. Up to the present, however, Carotene has not been tested in clinical practice, and although it is issued by the B.D.H. for medical use, there is no clinical evidence available at present as to its medicinal value. On the other hand, Radiostoleum, a product which is standardised physico-chemically as well as biologically, is being more and more widely prescribed in general practice in the prophylaxis and treatment of acute infections, particularly of colds, influenza and other infections of the respiratory tract; in fact, Radiostoleum is now generally recognised as a most valuable anti-infective agent.

These are but samples selected from a very wide range of exhibits by the company.

British Industrial Solvents, Ltd.

The exhibit of British Industrial Solvents, Ltd., serves to show the recent great developments in the use of ethyl alcohol as a raw material in the manufacture of industrial products. All the products shown are alcohol derivatives, and of the alcohols involved, ethyl alcohol plays by far the most important part.

Thus, ethyl alcohol is the primary raw material used in manufacturing the acetaldehyde, paraldehyde, acetic acid, acetone, butyl alcohol, butyl aldehyde, butyl acetate, ethyl acetate, diacetone alcohol and isopropyl acetate exhibited.

Again, ethyl alcohol or products derived from it (or from the fusel oil which is inevitably obtained when ethyl alcohol is produced by fermentation processes) enter into the manufacture of the remaining products exhibited.

The esters exhibited are of a quality not obtainable commercially until this firm commenced operations.

Technical representatives of the firm will be in attendance on the stand and will welcome inquiries concerning the various products.

W. J. Bush and Co., Ltd.

This firm are showing a complete series of flavour essences suitable for all purposes, and, in addition, are exhibiting a remarkable range of fine chemicals, essential oils, isolates, floral concretes and absolutes. Their latest productions include phenyl ethyl alcohol, amyl cinnamic alcohol and citronellol from citronellal, in company with vanillin, coumarin, heliotropine, terpineol, ionone and other products. There is a full range of essential oils and terpeneless oils and of isolates such as geraniol, anethol, eugenol, carvone, isoeugenol, etc.

As examples of intermediates in the aniline dye and other trades, there are aceto acetic ether, oxalacetic ether, malonic ester, sulphanilic acid, phenylhydrazine sulphonic acid, salicylic acid and salicylates, benzoic acid and sodium benzoates, benzyl chloride and derivatives, benzoyl chloride and many others. Of interest, also, will be a range of harmless food colours for all purposes. Cream of tartar, one of the products of the firm's Widnes works, is also shown.

This company is exhibiting a large number of by-products, including coal tar pitch of various grades for briquetting, road work and general purposes; creosote which is chiefly employed in the pickling of timber; road tar and tar-bitumen compounds of absolutely reliable standard; also a tar emulsion for cold application. Special facilities are offered in the matter of deliveries and also for spraying from modern road tanks.

The benzole products shown include motor spirit, pure toluene, solvents, high-flash naphtha and xylenes. Crystal carbolic acid is manufactured for use in the preparation of explosives, synthetic resins, and for medicinal purposes. Cresol testing 99/100 per cent., and giving a clear solution in caustic soda, is also shown.

Among the remaining exhibits may be mentioned anthracene, liquid disinfectants, fuel oil, green oil, sharp oil, black varnish, pyridine bases of various grades; naphthalene in many forms, including a special insecticide grade for horticultural use, also in crude form as used by firelighter manufacturers; sulphuric acid B.O.V.; sulphate of ammonia, neutral quality, guaranteed to contain not less than 21 per cent. of nitrogen; liquid ammonia; spent oxide used by sulphuric acid manufacturers; oil gas tar employed in the making of cheap varnishes, wood preservation, also for fuel purposes; ant repellent oil for the purpose of combating the mealy bug on coffee plantations; Becseal—a sealing oil for use in waterless gasholders.

These constitute the principal exhibits, and represent the by-products of 2¾ million tons of coal carbonised annually. The company is exceptionally well placed for exporting.

General Chemical and Pharmaceutical Co., Ltd.

The greater number of the chemicals displayed by this company consist of the company's "Judex" analytical reagents A.R., but in addition many general laboratory chemicals are exhibited, together with examples of the company's chemicals for electro-plating, and of "Oasis" accumulator acid and potash lithium electrolyte.

Samples are again shown of the special reagents for the detection and determination of various metals which the company has introduced, and which aroused particular interest at the 1930 exhibition. Leaflets descriptive of these reagents and of their methods of use are available.

Already one of the largest suppliers of accumulator acid in the country, the development of the fine chemical branch of the company's activities has enabled it, since the 1930 Fair, to transfer its manufactures to premises more than twice as extensive as its old works at Willesden.

Hopkin and Williams, Ltd.

This company has been a pioneer in the manufacture of fine chemicals in this country since the middle of the last century. Their products are well known in the scientific world to those engaged in research work and general technical investigation.

The exhibit draws special attention to Hopkin and Williams' brand of analytical reagents and to a new book of specifications governing their purity. This publication describes not only the reagents for general analytical puposes, but also several special organic compounds and a complete range of chemicals for the preparation of buffer solutions. The stringency of the tests demands a very high order of purity in these reagents, and their production constitutes a notable achievement of the British chemical industry. Standard sets of sealed buffer solutions containing the more generally used indicators are also shown, completing a comprehensive exhibit of chemicals for determinations of hydrogen ions.

In the chemical and technical section, driers used by the paint and varnish manufacturers will be of interest, such as manganese borate, cobalt acetate, etc.

Howards and Sons, Ltd.

Among the pharmaceutical products shown by this firm is the new quinine salt, quinine bisalicylosalicylate (Howards). This is an entirely new product, available under the trade name of Howards' Quinisan, and is a definite new salt, and not a mechanical mixture. In effect, it is equivalent to 1½ grains pure quinine alkaloid and 2½ grains of acetylsalicylic acid, and owing to its method of manufacture, it possesses the property of passing *beyond* the stomach *before* the acetylsalicylic acid becomes hydrolised, and thus prevents the liberation of free salicylic acid. Howards' paraldehyde P.B., it is claimed, is the first P.B. quality paraldehyde to be manufactured throughout in this country from British raw material.

A new type of highly purified synthetic menthol, known as menthol I.C.Y., is shown. In the matter of taste and smell this material is indistinguishable from the recrystallised natural menthol.

Of industrial chemicals, ethyl lactate was shown last year, but the quality has been very greatly improved. It is now completely miscible with petrol and with water. Its free acid content is now under 0·025 per cent. Paraldehyde technical is a new product of their manufacture, and, so far as can be ascertained, is the first technical paraldehyde manufactured entirely in England to be placed on the market. Benzol, thiophene-free, is also exhibited for the first time. It is now manufactured on a large scale, and is offered as a commercial product at a low price. Cyclohexane is a new solvent of constant boiling point, of great importance as a recrystallising and extracting medium in chemical and allied industries.

Imperial Chemical Industries

No stand at the British Industries Fair will be more eloquently descriptive of the world-wide character of British trade than that by Imperial Chemical Industries. This will be found in the Grand Hall at Olympia, and will be a lesson in geography, and especially in the geography of the British Empire. It takes the form of a modern building on which are placed in alcoves bold cut-out maps of the six continents—Europe, Asia, Africa, North and South America, Australia, and New Zealand. Around each map will be grouped samples of I.C.I. products relating to the trade of the continent concerned, together with examples of the products of each continent in which articles of I.C.I. manufacture are used. Further, each map will show the centres all over the world where the associated companies of I.C.I. have factories and direct representation. This arrangement will make a special appeal to the overseas visitor, because no matter from what part of the world he may come, he will find some article of interest linked to the information of how and where to buy it near his home. The stand will also act as a guide to the Fair, for on it is a large-scale map of Olympia, showing all the various industries represented, and how each is a customer or consumer of I.C.I. products.

The stand will, therefore, be an epitome of the objects which the British Industries Fair is designed to promote. It aims definitely at attracting and holding the interest of the buyer from overseas. It is also an object lesson in the ubiquity of the chemical industry, and emphasises how essential the industry is to industry and agriculture the world over. It will be interesting alike to the trade visitor or to the schoolboy. Within the stand there will be a practically continuous cinematograph performance of films made to illustrate the manufacture of I.C.I. products, from pictures of general interest such as the clay pigeon film, "Gunning Without Game," to those of a more technical nature.

Johnson and Sons

Johnson and Sons are displaying a whole series of fine chemicals as used for photographic and allied trades, including a complete series of developing agents. Silver nitrate, which is the most important chemical in the manufacture of sensitised material for photographic trade, is very prominently displayed. Other salts of precious metals include gold chloride, chloroplatinite of potassium and arvitin. There is also a very prominent display of pharmaceutical preparations, and chemicals and preparations of interest to the works chemist.

May and Baker, Ltd.

The range of products made by this firm becomes wider every year. Mercuric oxides (yellow and red) used extensively in anti-fouling compositions are now manufactured in a specially light form, with an increased covering power and anti-fouling effect. Mercury sulphide (vermilion) is made in varied shades to suit the requirements of customers in the paint industry and elsewhere. Corrosive sublimate is supplied for the preservation of timber, for electrical amalgamation purposes, disinfectants, etc., whilst calomel finds wide application in pharmacy.

Among bismuth salts, particular attention is called to bismuth carbonate extra light, which is supplied with a guarantee of purity and density.

Recently the firm began the production of Santonin on a large scale. This article was once practically a Russian monopoly, but supplies of the raw material, Artemesia Maritima, have been discovered within the British Empire, and British Santonin is now an established industry.

Thomas Morson and Son, Ltd.

This stand shows a striking departure from the stereotyped colour scheme. On a shelf on the interior walls a collection of curious old copper stills of various patterns is to be seen. These date back to 1842 or earlier, and it is interesting to contrast these utensils of bygone times with the elaborate plant used at the present time. The fascia is supported by four pillars with glass sides, wherein are shown a few chemicals taken at random from the large range which the firm manufacture. In the lower sections is a cone of crystallised bismuth metal showing the characteristic cubic formation with remarkable iridescent effects.

A pyramid of potassium iodide, the bold, well-defined crystals being particularly attractive owing to their size and brilliance, should appeal to students of crystallography. Fine chemicals are shown for use in medicine and pharmacy, in research laboratories, in certain technical processes, and for use in arts and crafts.

Spencer, Chapman and Messel, Ltd.

This firm will exhibit the acids for which they are noted, such as sulphur trioxide, oleum in strengths of 20 per cent., 40 per cent., 60 per cent and 80 per cent., concentrated sulphuric acid, battery acid, hydrochloric acid and chemically pure nitric acid.

Thomas Tyrer and Co., Ltd.

This firm will show the chemicals for which they are well known in connection with the oil, paint, rubber and perfumery trades, together with certain pharmaceutical chemicals. Among the chemicals for the oil and paint trades will be shown aluminium stearate, zinc stearate, resinates, linoleates, cobalt and manganese salts. Those for the rubber trades include zinc sulphide, cadmium sulphide, etc. In connection with the perfumery and cosmetic trades will be shown zinc stearate, magnesium stearate, etc.

The firm will also show a selection of the various pharmaceutical chemicals they manufacture, including bismuth carbonate and other bismuth salts, hypophosphites, citrates, scale preparations and analytical reagents and research chemicals.

Whiffen and Sons, Ltd.

Potassium iodide shown in the purest form obtainable has been a speciality of the firm for nearly 100 years. An interesting use is in the preparation of cattle foods, and a table of quantities and advice as to the method of administration, will be obtainable free at the stand. Other important iodine preparations are also shown.

Potassium, ammonium and sodium bromide, in the specially pure form essential for medicinal or pharmaceutical purposes, will also be on view. The reliability and excellence of Whiffen's products of the emetine group, particularly in hypodermic tablets in half and third grain sizes, is well known in tropical countries. Salicin, a cure for influenza, of which the firm was one of the earliest manufacturers, is in great demand. Vermilion is shown in some of the principal shades, but any shade can be matched on request. Among the pharmaceutical products may be mentioned caffeine, camphor, clove oil, almond oil and sandalwood oil.

Williams (Hounslow), Ltd.

These well-known manufacturers will exhibit a complete range of dyestuffs and harmless colours. In addition, they will exhibit a very large number of articles to which these dyestuffs are applied, such as leather, wood, tin, tin and aluminium foil, wool, silk, cotton, paper, jute, hemp, coir yarn, raffia, cellulose lacquer, hairdressers' sundries, soaps, candles, face powders, cosmetics, varnishes, oils, boot and floor polishes, inks, show finishes and waxes, bakelite and similar synthetic resins, rubber, printing inks, and many other manufactured articles which need dyestuffs in their making; also certain foodstuffs coloured with their harmless edible products.

One entirely new colour they have produced this year is Crispin Yellow R, and, to their knowledge, this is not produced by any other manufacturer. It is particularly suitable for dyeing leather, producing a strong, clean level shade, very fast to light, and as it will stand in a strong solution, it is also very suitable for staining leather; it is, in addition, a good colour for wool. Another entirely new colour is Crispin Brown 3R, of similar properties to above, producing a red shade of brown.

Among their recent specialities, mention should be made of their range of Spirisol colours, which have been produced especially for the paper bag printing trade. The colours used in this trade must be impervious to water and soluble in methlyated spirit, and great difficulty has been experienced in the past in obtaining colours of high concentration for this purpose. Their range meets the requirements of trade absolutely, and at the same time they are 100 per cent. dyestuff. This range of colours should be of interest to many firms abroad.

Canners of green peas, etc., have had great difficulty in obtaining a satisfactory colour for these vegetables since the prohibition in this country of the use of copper sulphate, and if canners abroad apply to them, they can assist them in this direction. This is mentioned because it is known definitely that many canners abroad have been seriously affected by this difficulty.

Application of Silver to Chemical Plant

By Donald McDonald, B.Sc., F.I.C.

A meeting of the Chemical Engineering Group of the Society of Chemical Industry was held at the Institution of Civil Engineers, Westminster, on Friday, when a paper entitled "Silver and Its Application to Chemical Plant" was read by Mr. Donald McDonald. The author notes a large increase in the use of the metal in this field and surveys some of its possibilities.

THE recent changes which have taken place in the economic position of silver, and particularly their influence on its price, make it highly desirable to examine the properties of this metal in order to see if it can be made use of in the construction of chemical plant. The chemical engineer, engaged in a never-ending fight against corrosion, cannot afford to neglect to study any material which possesses characteristics likely to be useful to him in this direction. Silver does possess such characteristics, so that even if the cost is relatively high it should not prevent us from discussing the metal from a chemical engineering point of view. With this end in view, therefore, I propose to summarise first the various factors which determine the present economic position of the metal, and then its physical, chemical, and general working properties.

Until a few years ago silver was definitely classified as bullion, a noble metal whose proper habitat was inside jewellers' shops, and whose sole commercial use, apart from currency, was that of ornament. More recently it had been used in making small pieces of chemical apparatus, usually for the handling of difficult organic acids; the peculiar reaction of its haloid salts to light had ensured the employment of large quantities in the photographic and cinema industries; and the many valuable properties of the silver solders were well recognised in both ferrous and non-ferrous industry. Nevertheless, silver remained at a price which discouraged investigation from the commercial point of view. Occasionally it has been used in the preparation of some article having a very large public consumption, where its use had a considerable publicity value, but hitherto all these cases have been sporadic and relatively small. Its great uses, therefore, apart from ornamental goods, have been in the form of bullion and specie—bars and coins.

Fall in Value

That latter use is now coming to an end, since even the East has adopted, or is about to adopt, new standards. The consequent fall in value has brought it within the reach of ordinary consumers and has enabled it to take its place among the economic metals. It is still rather expensive, perhaps (through the autumn of 1930 it stood at about 21s. per lb.), but not more so than other new economic metals, such as beryllium, so that it becomes a question of how desirable are its properties and those of its alloys, and what the trend of its price is likely to be in the future.

Already its employment in industrial chemical plant is reaching appreciable dimensions, and pieces of apparatus weighing up to 3 or 4 cwt. have been, and are being, made from the pure metal, most of them for handling acetic acid. This indicates that the first use of pure silver in plant construction depends upon its resistance to organic acids, particularly in the preparation of foodstuffs. This is a very natural field for it to occupy, since one of its age-old applications has been the manufacture to table utensils or the coating of such utensils by electroplating if made from a base metal. Such widespread use must be due in the first place to the absence of staining by the weak organic acids found in or used with prepared food, and only to a secondary extent the attractive colour and high finish of the polished metal. Although numerous alternatives are available for table cutlery, many equal in appearance and some possibly superior to silver, there has been no indication of any wholesale displacement of silver or electroplate. As, therefore, the preparation of food has now to a considerable extent left the kitchen for the factory, it follows naturally that the same metal should be used in such factories if economic conditions make it at all possible.

Fine silver is now commercially available as sheet of all gauges down to thin transparent, hand-beaten foil; tubes of all diameters, either welded or, up to about 2 in., seamless drawn; and wire, either rolled, or drawn down to 0·0005 in. From the last gauzes of any mesh can be woven, and from tubes and sheet many kinds of apparatus can be fabricated. The metal can be joined either by autogenous welding or by soldering with a silver solder, an alloy of the silver-copper series with or without an addition of zinc, but this latter method is not desirable if the product has to withstand corrosion. The solder, containing as it does considerable amounts of copper, is much weaker than the main body of the article, and is likely to give rise to electrolytic action. Autogenous welding is therefore employed for practically all chemical purposes, but this is a very delicate operation, since the high thermal conductivity of the metal increases the difficulties of local melting, and when molten the absorption of oxygen must be dealt with, or there will inevitably be embrittlement and blistering on solidification. Fortunately the more important bullion refiners have been able satisfactorily to surmount these difficulties, and welded apparatus can be obtained in which the weld can be made as strong, both mechanically and chemically, as any other part of the article. Before placing orders for the manufacture or repair of silver plant, chemical engineers should assure themselves that the firms have the requisite knowledge and skill, for unskilled attempts to weld the metal will almost inevitably result in ruining it.

Silver Castings

Castings are not very often called for on account of the high price of the metal, but sound ones can be and have been made, both in the fine metal and in its alloys, up to 2 cwt. in weight. If larger castings are ever required, no doubt a special technique will have to be evolved on account of the danger of oxygen-absorption, but there is no reason to think that this is impossible.

The most extensive application to chemical plant evident so far is in the condensation and general handling of acetic acid, which is particularly corrosive at the moment of condensation. This may be due to the co-operative action of finely divided acid and oxygen and has given very great trouble to manufacturers who usually used copper condensers. Many of these have now been abandoned in favour of silver, with, as far as I can hear, entirely satisfactory results. Some of these are large pieces of plant weighing several hundredweight, and are of both the tubular and the coil types, the tubes being welded or, if not too large, seamless solid drawn. The heat transmission is excellent, and, on account of its superior thermal properties, a silver condenser can be considerably smaller than a copper one designed to do the same work. Since silver possesses a low specific heat, a fairly high coefficient of expansion, and high thermal conductivity, the apparatus will expand rapidly on the application of heat, and in some cases special arrangements must be made to allow this to take place without giving rise to buckling.

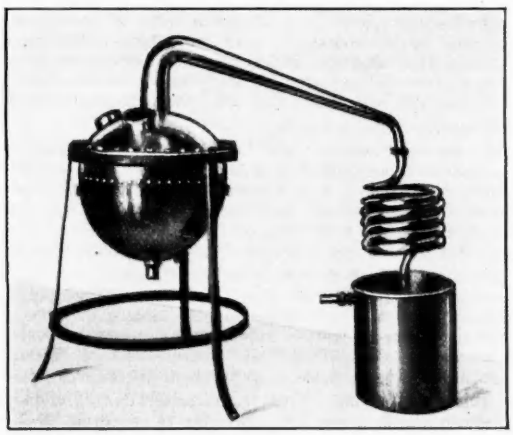
Use in Chemical and Allied Trades

The use of silver is spreading to other allied trades, and so to the food industries. In the distilled vinegar industry the use of copper, even when tinned, has not yielded universally satisfactory results, and trouble has occurred when the vinegar made in it is employed as a pickling medium. Small quantities of copper in solution, even though not toxically serious, are apt to be absorbed by light-coloured pickles, such as onions, which assume a pale green complexion highly undesirable in modern competitive display. The gunmetal or bronze taps of storage vessels give rise to discoloration and unpleasant flavour in some of the essential oils used for flavouring food, whilst in their distillation tinned copper stills and condensers produce results similar to those observed in the vinegar industry. Moreover, apart from the contamination of the product, the life of the apparatus itself is short. Fine silver stills and condensers and silver alloy taps and cocks are being generally employed to overcome the manifold troubles experienced in these particular industries.

In other food-preparing trades silver has found various relatively small uses, although in most of them the concentrations of acid handled are such as can be expressed only in terms of *p*H. For instance, in the milk, cider, and brewing trades it is used for siphons, pipe lines, pasteurising coils,

and the nozzles of filling machines. There is no evidence that the metal is in any way soluble in the liquors concerned, but it will probably be advisable to mention at this stage what is known of its physiological and biological properties, and while I am not aware of any definite research upon these questions, there are certain well-known facts which throw some light upon them. In surgery pure silver is inserted in the human body in situations which expose it to the action of the blood and digestive juices, the commonest case being that of the plates used in trephining where the metal is placed close to the brain. No ill-effects are traceable to the metal. Further, in certain parts of the East it is the custom to consume large quantities of pills and cachous which are coated with metallic silver, again without ill-effect. Silver is therefore inert physiologically, and we can assume with a certain amount of confidence that it will also be inert biologically, a point of very great importance to the industries, which are based on the work of micro-organisms.

In the manufacture of acetate rayon silk fine silver condensers are utilised in the recovery of solvents; while the



STEAM-JACKETED SILVER STILL, WITH CONDENSING WORM.

organic solutions employed require valves, cocks, and taps made from silver alloys. The viscose industry, on the other hand, is not a congenial home for silver on account of its sulphurous nature. In the manufacture of synthetic acetic acid silver is used as a catalyst in the form of fine wire mesh to promote the oxidation of ethyl alcohol to acetaldehyde. It is also used in the distillation of phenol.

Doublé Sheet

Not only is the pure metal used and, to a less extent, its copper alloys, but also what is known as *doublé*, in which fine silver sheet is rolled on to copper or other base metal, thus reducing the first cost of the apparatus. Pipe lines can be made in this way by drawing a tube of the base metal over a seamless tube of silver, the combination being sufficiently strong to withstand complete vacuum without separation. The outer tube can be made of suitable thickness to stand high internal pressures. Coils for heating corrosive liquors also can be made in the same way, but with the silver outside. Small vessels can be made of the *doublé* sheet quite satisfactorily, but with larger sizes jointing difficulties raise which rather limit its application.

Another method of obtaining some of the valuable properties of silver without its cost is to coat copper or other vessels electrolytically, but this is not very satisfactory for chemical processes, since the coating has frequently weak patches and pores and is so thin that stirring or the mere movement of the contents created by boiling removes it in course of time. It is, however, used in plant for jam-making by some firms, and seems to give satisfaction. Solid homogenous silver linings can be obtained for existing vessels which are not subject to vacuum provided that their construction is suitable, and where silver-plated has given poor results, lined vessels have been found to give good service.

In inorganic chemical processes the present uses of silver are less evident than in organic ones. The mineral acids generally attack it, and there are many more alternative metals available which cannot be used in the organic processes. There is no reason why it should not be used in handing cold hydrofluoric acid of all strengths, dilute sulphuric acid up to the limits mentioned above, dilute hydrochloric acid provided the protective coating of silver chloride is not removed, and other substances indicated in the section on the chemical properties of the metal.

For the melting and casting of the caustic alkalis silver apparatus is employed and stands up to its work well.

Silver is the metal which can be most satisfactorily deposited on glass in the form of a mirror, and apart from its ordinary use, is employed to reduce the emissivity of heated glass surfaces or to decrease the heat-absorption of cold ones, the most familiar examples being the walls of the ordinary vacuum flask.

In a finely divided form—say, 200 mesh—which is commercially available in either amorphous or crystalline varieties, silver has a small use in certain types of electrical fuses, presumably where a controlled conductivity is required.

Drumm Storage Battery

An application of silver which has some slight connection with chemical engineering is in the Drumm storage battery. This is an alkaline electrical accumulator which, it is claimed, has much higher rates of charge and discharge than are found with any other known type and a much greater capacity per unit of weight. These superiorities have made it of interest in locomotive traction, and at present it is undergoing investigation and trial by the Irish Free State Government, which has recently been voted £25,000 for the purpose. The inventor has handed over his rights to that Government, which is anxious to exploit the invention on its railways in connection with the Shannon Power scheme. A specification purports to give some details of the actual construction of the accumulator, and a number of other patent applications are pending. The specification states that the positive plates are of cellular construction and charged with a mixture of finely divided metallic silver, silver oxide, and ceric oxide. The negative plates are described as of "the usual oxides of iron or cadmium or a mixture thereof," while the electrolyte is a solution of caustic potash. The anode reactions in charging are given as, first, a formation of silver oxide from the metallic silver, and second, its quantitative oxidation to silver peroxide (Ag_2O_2). On discharge this latter is first reduced to oxide and then to metal. The *E.M.F.* is claimed to be 1·5 volts during the first phase of the discharge and 1·15 volts in the second. The claimants aver that an "accumulator formed in accordance with this invention would permit of very rapid rates of charge and discharge on account of its very low internal resistance, while the energy capacity is high per unit of weight employed."

There are many small and sporadic uses of silver which are not allowed to become public property, but the above is a short summary of those which are generally known to exist. They are spreading, so evidently the metal really has properties sufficiently valuable to counterbalance its still relatively high cost, which is, to some extent, discounted by a very high scrap value. The salvage value of silver is 50 to 70 per cent. of its original cost, according to the amount of workmanship in its construction.

French Alkali Production

IN a note on the French alkali industry, the U.S. Commercial Attaché at Paris reports there has been little recent change. The Solvay Co. is, of course, the largest producer and other producers are the Adour soda works and the Basque salt works which turn out small tonnage of sodium carbonate and caustic soda. The present French production of sodium carbonate is estimated at 495,000 metric tons. The 1929 French output of caustic soda was 34,000 metric tons of which 15,000 tons were produced by the Solvay Co.

New German Hydrogen Peroxide Process

A RECENTLY founded French company is reported as proposing to go into production with a new electrolytic process for making hydrogen peroxide, which though consuming more electric current is claimed to be a simpler operation. The new process, developed in part by German and Austrian firms, is the property of the Deutsche Gold-und Silverscheide-Anstalt and is understood to have been tested out commercially in a pilot plant of the Oesterreichische Chemische Werke.

Society of Public Analysts

Scientific Papers and Elections

SIX papers were presented at the ordinary meeting of the Society of Public Analysts, held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, February 4, with the President (Dr. J. T. Dunn) in the chair.

A paper entitled "The Solubility of Milk Powder—The Moisture Factor," by L. H. Lampitt, D.Sc., F.I.C., and J. H. Bushill, M.Sc., F.I.C., stressed the complicated nature of the changes which take place when spray dried milk powder absorbs moisture. The freezing of the fat, whereby it is made available for solution in organic fat solvents, is one indication of the changes taking place above the "critical moisture content," a figure dependent upon the solids-not-fat. The authors traced the effect of time and temperature on the development of insolubility, and gave analyses of the insoluble matter which is found to be mainly casein.

Organic Compounds

For "The Determination of the Hydroxyl Content of Organic Compounds: Estimation of Castor Oil," S. Marks, M.Sc., A.I.C., and R. S. Morrell, Ph.D., F.I.C., found Peterson and West's modification of the method of Verley and Bölsing, in which the hydroxyl content is determined by treatment with acetic anhydride and pyridine, to be the most satisfactory method, and particularly suitable for the estimation of castor oil.

"The Determination of the Carboxyl and Aldehyde Content of Organic Compounds: Estimation of Phenylhydrazine," was presented by the same authors, and the most suitable method was found to be that of Ellis, in which the substance is treated with excess of phenylhydrazine, and the nitrogen evolved on treating the excess with Fehling's solution is collected and measured in a simple form of apparatus, an allowance being made for the benzene vapour.

"Food Control in Holland," by A. Van Raalte, D.Sc., and J. Straub, gave an account of the Dutch method of administering food control, based on legal standards arrived at in many instances by agreement between the directors of the Control Service and the large manufacturers. Not only foods but also other commercial products such as toilet articles, wallpaper, insecticides, etc., are subject to control. There is a right of inspection of premises where food is manufactured or sold, and this, coupled with intensive sampling, has reduced to 6·7 per cent. the percentage of samples falling below this standard. A list of the standards for the different foods and other articles was appended.

Small Quantities of Methane

"The Determination of Small Quantities of Methane," by H. R. Ambler, B.Sc., F.I.C., described a convenient and precise technique. The hydrogen and carbon monoxide are oxidised by means of cupric oxide at about 300° C., the resulting carbon dioxide removed, and the methane determined by burning with oxygen in the presence of platinum wire at bright yellow heat, and measuring the carbon dioxide produced and the residual oxygen. The combustion of ethane gives different ratios of these gases.

"The Fatty Acids and Component Glycerides of Indian Ghee," was the work of R. Bhattacharya and T. P. Hilditch, D.Sc., F.I.C. The analytical constants of two samples of buffalo ghee and two of cow ghee have been determined, and their fatty acids analysed by the method of fractional distillation previously devised by the authors. The two cow ghees gave figures falling within the limits previously recorded for English and New Zealand butter fats, but the buffalo ghees showed rather higher Reichert-Neissl and Kirschner values. They also contained more butyric and stearic acids than were found in cows' butter.

Certificates were read for the first time in favour of: Cecil Chilvers, B.Sc., F.I.C.; Jack Hubert Hamence, M.Sc., A.I.C.; Cecil John House, B.Sc., A.R.C.Sc., F.I.C.; Henry George Rees, B.Sc., A.R.C.Sc., A.I.C. Certificates were read for the second time in favour of:—Kenneth Bullock, M.Sc., Ph.D., and Frederick Cecil Hymas, B.Sc., A.I.C. The following were elected members of the society:—Arthur Nicholls Ainsworth, B.Sc., Bertram Arthur Gough, William Henry Gough, M.Sc., A.I.C., and William Henry Shilling, B.Sc., A.I.C.

Manufacture of Synthetic Resins

Factors in the Design of Plant

Two papers were read at the joint meeting of the Manchester Section of the Society of Chemical Industry and the Manchester and District Section of the Institution of the Rubber Industry held on Friday, February 6, at the Engineer's Club. The first dealing with the electrical properties of synthetic resin moulding powders was the work of Messrs. E. A. Beran, N. Strafford and G. G. Walker and was reported in our last issue. The second paper was by Mr. A. Fraser and was entitled: "Plant used in the Manufacture of Synthetic Resins."

There was great similarity between the machinery used in the making of rubber articles and synthetic resin plastics, said Mr. Fraser. There were merely slight variations of design due to the physical characteristics of the resin material. The chemical, physical, and electrical properties of synthetic resins were controlled or modified by the use of plasticisers, accelerators, fillers, hardeners, and softeners and also by the use of pigments and dyes. All these various factors were usually modified, or finally consolidated, by the application of heat, a matter of considerable importance both in the rubber industry and to the synthetic resin moulding industry in the production of final shape and strength. There was, however, one very great difference in the two classes of materials; one was thermal plastic, while the other was thermal setting or hardening.

In the manufacture of both classes of materials temperature control was of great influence in deciding upon the design of the necessary machines. For instance, it was most important that the material should not be overheated during the incorporation of fillers and dyes, etc., otherwise scorching would occur. The best type of machine was that which permitted the addition of such materials in the cleanest and quickest manner possible, while, at the same time, developing only slight heat in the mix. For this purpose, both the "Banbury" and the "Baker-Perkins" types of machines were largely used, as well as the "Two Roll" mixers, in both industries. Plastic moulding resins were prepared in autoclaves, the resin being mixed with fillers and other materials. The material was subsequently ground to powder if required, and then blended to cancel out the different variations of the different batches. Finally a vacuum process of drying was resorted to.

Mr. Fraser showed screen illustrations of the different types of machines employed for the preparation of synthetic resins. The friction ratios for mixing rubbers and synthetic resins, he said, were almost identical, and there was not much difference on the bearings if the mixing was done quickly.

Fair Play for Gas

To the Editor of THE CHEMICAL AGE.

SIR,—It is with grave concern that I notice a serious increase in the restrictions imposed upon municipal tenants by the authorities, in spite of protests in the House of Commons some months ago.

At that time attention was drawn to the fact that nearly 100,000 householders in various parts of the country were not allowed to choose the kind of lighting, heating, and cooking which they preferred. Now it is London ratepayers on L.C.C. housing estates who have to submit to the ruling of a dictatorship and, in some cases, tenants who object to the power provided are being threatened with eviction.

The London County Council is the most powerful landlord in the country, and that it should thus interfere with the rights of private citizens is a most serious menace to one of the basic principles of our liberties, viz., that an Englishman's home is his castle. Such an attitude is absolutely indefensible, for these building estates are being developed with the assistance of the taxpayer's money and for the benefit of the taxpayer.

May I urge that the authorities should once and for all put this matter right by insisting that tenants should be allowed absolute freedom of choice between gas and electricity for lighting, heating, and cooking in their homes.—Yours etc.,

C. HOWARD BURY

House of Commons.
February 3, 1931.

Phosphates and Superphosphates

Factors which Affect International Trade

RECENTLY we published lengthy extracts from Mr. A. N. Gray's book, *Phosphates and Superphosphates* (International Superphosphate Manufacturers' Association, London, 8s.), reviewing the history of the phosphate industry. Below we give a concluding instalment dealing with the general factors which affect the industry in various countries.

Changing Conditions

From 1895 onwards, superphosphate has been sold at prices which have been of very great benefit to the consumer but have not, in the full sense of the term, been remunerative to the producer, and there can be no doubt that the remarkable advance in the world's total consumption which the statistics reveal has been, in some measure, due to the low prices which have obtained.

Another most important factor in connection with the industry has been the development of zinc production. Zinc "concentrates," so-called, contain a certain percentage of sulphur, which is either burned off in the manufacturing process or as a special operation, and results, therefore, in the production of sulphuric acid. This acid, properly termed "by-product" acid, was for many years the dominating factor in Belgium and led to the production of very large quantities of superphosphate, vastly in excess of Belgian requirements. The neighbouring countries, Holland, France and Great Britain, suffered heavily from this over-production of superphosphate in pre-war days, and Holland, for example, despite the fact that a home production of great proportions has been built up, still imports about 100,000 tons of superphosphate annually from Belgium. Of Holland, it can also be said with a measure of truth that, had it not been for the very cheap sulphuric acid obtainable from Belgium, her superphosphate industry could not possibly have attained the importance it enjoys to-day: it would be true also to say that about 40 per cent. of Holland's requirement of sulphuric acid for superphosphate manufacture was still being met by imports from Belgium in the year 1929.

So low was the price of sulphuric acid in Belgium in pre-war years that even up to 1913, despite the fact that acid is by no means an easy product to transport, it was possible to import the Belgian product into Great Britain at a lower price than that at which it could be manufactured, and quite a considerable trade was done in such import acid.

Selling in Distant Markets

It is probable that the experiences of the future will repeat the history of the past. The exporting countries gradually open up new markets for their superphosphate and create a demand for their product, but just as soon as a consumption of material dimensions has been firmly established the tendency has been for a factory to be built to cater for the local requirements. In many cases, however, such local factories are not able to cover the whole of the demand in their locality and consequently, though imports may be either for a time, or permanently, reduced, they are not entirely eliminated, especially in countries which have an extensive seaboard and several ports. Superphosphate is a low priced product and, in general, sea carriage is very much lower in cost than is internal rail transport. Its bulk in proportion to its weight is small and ocean freights, therefore, are usually low, so that it is often possible for the European exporter to maintain a trade in a distant market despite the establishment of a local factory. It can even happen, as has been strikingly demonstrated in the case of Great Britain, that exporting countries, operating from factories erected for the purpose, can build up a large business in the face of a well established home industry. The process is facilitated by the fact that superphosphate is in demand all over the countryside and where there are a number of ports through which it can enter the importer is able to choose points distant from the home works for his operations.

Fertilisers in New Zealand

FERTILISERS in New Zealand are carried on the railways at rates exceptionally favourable to farmers compared with other commodities. During the first nine months of 1930, however, only 432,301 tons were transported, compared with 466,105 tons in corresponding months of 1929, a decrease of 19,331 tons in the North Island and 14,473 in the South.

Pyrites for Newsprint Industry

New Canadian Development

THE Royal Bank of Canada January Bulletin states that among recent developments in the Canadian mineral industries is one which holds promise of making substantial savings for the newsprint industry. It is hoped that by making use of a new process for burning Canadian pyrites ore, invented by Mr. Horace Freeman of Shawinigan Falls, Quebec, that the newsprint industry can advantageously discontinue annual purchases of more than four and one-half million dollars' worth of sulphur from abroad. In addition to direct savings to the newsprint and chemical industry amounting to about $1,600,000 a year, the by-product of this process, iron ore, would supply one-eighth of the total annual iron ore requirements of Ontario and Quebec.

The idea of using pyrites is not new. In fact, pyrites was the common source of sulphur before the discovery of the great brimstone deposits in the south-western part of the United States. Even in 1928 the amount of pyrites produced was the equivalent of 3,300,000 metric tons sulphur, while brimstone production amounted to only 2,560,000 metric tons. Since it takes 2·2 tons of pyrites to equal 1 ton of sulphur, the total world production of pyrites in 1928 was 7,300,000 metric tons. Under the methods in common use before the Freeman burner was developed, the cost was so high and the equipment so complicated that there had been no idea of substituting Canadian pyrites for foreign brimstone.

Under the new process, the pyrites is ground into a fine dust, which is blown into a pre-heated oven, where it burns with sufficient heat to maintain the high temperature without the use of other fuels. The gases formed in this oven are cooled with water and this cooling process generates sufficient steam to pay for the whole cost of operation of the plant. In the first experiments made with this burner at a newsprint mill, it was necessary to bring the pyrites ore from British Columbia via the Panama Canal. This long haul greatly increased the cost of the ore. This newsprint mill, however, which was on the St. Lawrence River, where sulphur could be brought in at a low freight rate, was able to show savings of six dollars per ton of sulphur. Engineers have estimated the comparative cost of pyrites and sulphur to the newsprint industry, as follows: Total cost of sulphur, $4,000,000; total cost of pyrites, $2,375,000; approximate savings, $1,652,000.

Research Fellowships in Metallurgy

IN co-operation with the United States Bureau of Mines and the State Mining Experiment Station, the School of Mines and Metallurgy of the University of Missouri offers four fellowships. These fellowships are open to graduates who have the equivalent of a B.Sc. degree and have had the proper training in mining, metallurgy, or chemistry, and who are qualified to undertake research work. The income of each fellowship is $800 for ten months beginning September 1, 1931. Fellows pay fees amounting to approximately $44 per year and about half of their time will be spent in research work under the direction of the Bureau of Mines staff resident at the School of Mines. The purpose of this work is to undertake the solution of definite problems confronting the mining and metallurgical industries. For 1931-32 four fellowships will be granted and applications will be received up to June 15, 1931.

Germany's Trade in Lacquers

GERMANY is practically self-sufficing as regards lacquers, as is shown by the fact that it exports over 16 times the quantity it imports. Comparative figures of imports and exports for the past four years are:

	Imports Metric tons	Exports Metric tons
1926	288	5,434
1927	458	6,971
1928	632	8,005
1929	598	9,835

Of the imports, the aggregate is composed mostly of nitrocellulose lacquers. Last year the main countries of origin for lacquers were United States 247 tons, United Kingdom 162 tons, and the Netherlands 103 tons.

C

Chemical Advances in 1930

THE *American Journal of Pharmacy*, in surveying the events of 1930, notes the following points of advance in chemistry and medicine :—

Chemistry

The existence of rotating molecules in solid compounds was reported by Professor Linus Pauling, of the California Institute of Technology, and Dr. Sterling B. Hendricks, of the Fixed Nitrogen Laboratory, United States Department of Agriculture ; this discovery has an important bearing on the heat capacities of solids.

The magnetic susceptibility of samarium sulphate octohydrate was announced by Simon Freed, of the University of California, arousing great interest among chemists because the discovery indicates the possibility of electronic isomers in the solid state.

The chemical puzzle of the structure of the crystal of the silicates was solved by Sir William L. Bragg, Victoria University of Manchester, and Professor Linus Pauling, of the California Institute of Technology.

A new gas for use in electric refrigerators, non-poisonous and non-inflammable, which is a compound of carbon, chlorine and fluorine, was the invention of Thomas Midgely, Jr.

Carotin, the material that makes some foods yellow, is important for nutrition as well as the green chlorophyl, because vitamin A is associated with this colour in vegetables, butter, and egg yolk ; it was discovered by S. M. Hauge and J. F. Trost, of the Purdue University Agricultural Experiment Station.

Bacteria obtained from brewer's malt may now be pressed into the service of the chemist to eat away the cell walls of plant tissue and liberate the vegetable oil, according to a method developed by John Woods Beckman, Oakland industrial chemist.

A device for removing carbon monoxide from the exhaust gases of an automobile by means of a catalyst was demonstrated by the inventor, Dr. J. C. W. Frazer, of Johns Hopkins University.

Crystals of rubber were obtained for the first time in the chemical laboratories of the United States Bureau of Standards.

Medicine

A hormone from the cortex of the suprarenal glands was isolated by Drs. W. W. Swingle and J. J. Pfiffner, of Princeton University, and used by Drs. Leonard G. Rowntree and C. H. Greene, of Mayo Clinic, to treat hopeless victims of Addison's disease, in the same way that insulin affects the coma of diabetes. Dr. F. A. Hartman and Dr. K. A. Brownell, of the University of Buffalo, also obtained an extract of the same gland.

The filterable virus germ which causes multiple sclerosis, or "creeping paralysis," was discovered with the aid of a special ultra-microscope at a magnification of 1,800 diameters by Sir James Purves-Stewart and Kathleen Chevassut, of the Westminster Hospital, London.

An artificial lung, or respirator, was invented by Drs. Philip Drinker and L. A. Shaw, of the Harvard School of Public Health, to keep alive patients whose breathing muscles are paralysed in infantile paralysis or who are victims of gas poisoning.

A new method for studying the microscopic growth of living tissue in a warm-blooded animal was developed at the University of Pennsylvania School of Medicine.

Vitamins in sufficient amounts will prevent infection of animals, and possibly man, with leprosy, it was reported by Dr. J. Shiga, dean of the Imperial Medical Faculty, Seoul, Korea.

A new species of the meningococcus organism, cause of meningitis, was found by investigators of the United States Public Health Service.

Experiments proving that the common cold is caused by a filterable virus were reported by two groups of investigators.

A phenol compound, tri-ortho cresyl phosphate, was found by the United States Public Health Service to be the adulterant which caused thousands of cases of partial paralysis from drinking bootleg Jamaica ginger, known as "ginger jake."

A new chemical method of standardising ergot was devised by Dr. M. I. Smith, of the National Institute of Health, formerly the United States Hygienic Laboratory.

The time required for blood to clot, vitally important in surgical operations is shortened by feeding the patient vitamin D.

Study of the chemical changes taking place in the brain was made possible for the first time through a technical procedure developed by Dr. Abraham Myerson, of Boston, whereby blood is taken from the artery leading to the brain and from the vein which drains the brain and the chemical contents of the two samples compared.

Gas Light and Coke Company

Sir D. Milne-Watson on Unfair Competition

SIR DAVID MILNE-WATSON presided at the general meeting of the Gas Light and Coke Co. held at Westminster on Friday, February 6, and protested vigorously against the "boosting" that was being given to electricity by the Government and many local authorities. It was grossly unfair, he said, that a Minister of the Crown, whose duty surely it was to be impartial, should so far forget his public position as to come forward as special pleader for a particular industry, and not only recommend the use of electricity in general terms but advocate particular electric installations for domestic use. Another serious problem for them, was the government's delay in dealing with new legislation urgently required by statutory industries. The principal provisions under which they worked dated as far back as 1847, when gas was a monopoly. Now it was not a monopoly. It was face to face with acute competition, not only from electricity but also from oil, and yet they were still fettered in many respects by the operation of out-of-date Acts.

During the past year the company had experienced a decrease in business of 2½ per cent., due mainly to mild weather in the early months. With regard to residuals, coke and breeze showed an improved position, having brought in over £100,000 more. Tar and its products were not so satisfactory, and the revenue from them showed a reduction. The one feature which was thoroughly unsatisfactory was sulphate of ammonia, on which in 1929 they had made a profit of £77,000, and last year a loss of £16,000. For this unpleasant result the company was in no way responsible. The unsatisfactory market position had been brought about by the large quantity of nitrogen which was now being extracted from the air by synthetic plants not only in Great Britain, but also in Germany, France, Italy, the United States, Japan, and elsewhere. There was no prospect of the situation improving, inasmuch as it was the policy of the countries mentioned to possess their own nitrogen plants, not only for producing the fertilisers they required, but also as a home source of nitrogen in the event of war. They received about £12 a ton for sulphate before the war, and to-day obtained less than £5 per ton. They could not avoid the manufacture of sulphate of ammonia as they were not allowed to run the ammoniacal liquor into the sewers, and were compelled to work it up into sulphate of ammonia. They were doing all they could to find means to remedy the position, and research was taking place all the time to see whether any other use for ammoniacal liquor could be discovered.

The low temperature plant at Richmond had been operated during the year, and had come to an arrangement with the Government Department concerned to carry on work there for another year. "Gloco," the smokeless fuel produced, had been generally considered satisfactory. Unfortunately, however, the process had not been a commercial success. The tar produced had been found unsuitable for roadwork and was only at present saleable for fuel. Research was being actively carried on, however, in the hope of finding some better use for this product.

German Trade in Sodium Sulphate and Bisulphate

EXPORTS of sodium sulphate and bisulphate from Germany for the first nine months of 1930 were 128,306 metric tons compared with 131,421 tons for the same period of the preceding year. The main countries for exports were : Sweden, 41,800 metric tons ; Belgium, 24,291 tons ; United States, 23,331 ; and Finland, 15,134 tons. German imports of sodium sulphate and bisulphate for this same period were 1,757 metric tons compared with 63 for the previous year. Czechoslovakia supplies practically all the imports of sodium sulphate and bisulphate.

From Week to Week

UNIVERSITY NEWS: *Cambridge*—Dr. Dixon has been reappointed University Lecturer in Biochemistry.

THE SPANISH CHAMBER OF COMMERCE in London informs us that a Spanish firm is open to represent British exporters of cyanides. Further details may be obtained from the Secretary, 5, Fenchurch Street, London.

EMPLOYEES at the chemical works at Cwmbran, who were temporarily suspended, have been given final notice, and most of the staff have received one month's notice. The works is controlled by Imperial Chemical Industries, Ltd.

GERMANY'S EXPORTS of chemical products dropped in value during the past year by £9,580,000, to £59,145,000, while her imports were £3,100,000 lower at £12,950,000. In weight the exports dropped by 622,000 tons, to 5,058,000 tons, and the imports by 76,000 tons, to 1,835,000 tons.

A BENZINE PRICE WAR in Germany has developed in intensity and the Russian producers on Tuesday reduced their sale price by about 2 pfennigs below the tank prices of their competitors. They also decided on a further 1 per cent. price reduction, except in the districts of Berlin, Hamburg, Düsseldorf and Central Germany. The German producers have also reduced their prices.

A HUMOROUS INCIDENT occurred at Olympia on Tuesday when exhibits were being unpacked for the stands at the British Industries Fair. Exhibits of high explosives, bombs and cartridges were being carefully taken out of a van, when one of the horses darted forward, seized a cartridge from the hand of the foreman and ate it. The onlookers waited in horror for something terrible to happen, but the horse appeared none the worse. It was found that the cartridge was an imitation made in marzipan.

MR. W. A. SMITH, general manager of the Birmingham Gas Department, in an address on "Gas Service" to the Birmingham Rotary Club on Monday, stated that as a result of research very little trouble was experienced to-day from the deposition of naphthalene. This was washed out of the gas by a plant at the works. The gas industry was now battling with the slump which had occurred in the value of residual products, particularly tar and ammoniacal liquor.

"THE MANUFACTURE of Heavy Steel Forgings for the Chemical Industry" was the title of a lecture delivered to members of the Birmingham and Midland Section of the Society of Chemical Industry on Tuesday night by Dr. J. H. S. Dickenson, of the English Steel Corporation, Sheffield. Large steel pressure vessels, he said, were used for the modern steam plant, and in the chemical industry one such vessel of hollow forged steel often weighed as much as sixty tons. Many difficulties had to be overcome in the production of very large ingots, some of which weighed 200 tons.

MR. JOHN BENN, who is representing THE CHEMICAL AGE at the forthcoming British Empire Trade Exhibition at Buenos Aires, has also been included in the official delegation organised by the Federation of British Industries in connection with the Exhibition. Others who have been added to the Delegation are Mr. J. T. Webster (managing director, Twyfords, Ltd.), Mr. E. F. Ievers (managing director, The Eyre Smelting Co., Ltd.) Mr. John Kerr (managing director, Gourock Ropework Co., Ltd.), Mr. Mark Firth (Thos. Firth and Sons, Ltd.), and Commander George Gilbertson, D.S.O. (director, W. Gilbertson and Co., Ltd.).

A BIG CONTRACT for new by-product coke ovens giving employment to some hundreds of men during the next year has been placed with Woodall-Duckham Vertical Retort and Oven Construction Co. This follows the merger of the Wigan Coal and Iron Company and the Pearson and Knowles coal and iron group, and a scheme for the development of the Partington Co.'s steel plant at Irlam, near Manchester. This scheme includes a new dock on the Manchester Ship Canal, blast furnaces and open hearth improvements, additions to rolling mills and new by-product coke ovens. A battery of fifty-one coke ovens is to be built, capable of producing five thousand tons of coke a week for use in furnaces. The contract also includes the supply of coal handling, coke handling plant, by-products recovery plant, and benzol recovery and rectification plant. Under normal conditions it is estimated that about 750,000 gallons of motor spirit will be produced a year.

INTERNATIONAL COMBUSTION, LTD., Underfeed Stoker Co., Ltd., and Combustion Steam Generator, Ltd., will move from their present offices in Africa House, Kingsway, to Aldwych House, Aldwych, London, W.C.2, on March 1 next.

DR. D. T. MURRAY, who has just been appointed principal of the Constantine Technical College, Middlesbrough, has been principal of Smethwick Municipal College since 1924. He is an M.Sc. (Birmingham), a Ph.D. (Leipzig), and a Fellow of the Institute of Chemistry.

BRITISH OVERSEAS CHEMICAL TRADE figures in January, according to the preliminary Board of Trade announcement, show that imports were valued at £973,658 and exports at £1,707,446, as compared with £1,259,061 and £2,172,831 respectively in January 1929.

A RAPID METHOD for the determination of selenium has been elaborated by Dr. Benesch and Dr. Erdheim, of the Pulverfabrik Skodawerke-Wetzler A.G. It is based on the use of hydrogen and can be used for metallic selenium as well as for selenious and selenic acids. The hydrazine used can be recovered and used again.

EXISTING WAGES AND CONDITIONS of workers in the drug and fine chemical trades will end, under the Notice given to the Trades Union by the Employers Federation, on Saturday, June 20. A new National Agreement, to be operative throughout the works controlled by the Federation, will come into force on and from Monday, June 22.

NO REDUCTION in the establishment of the chemical warfare school at Porton, stated Mr. T. Shaw, in reply to questions in the House of Commons on Wednesday. It was known that gases were in existence and he was certainly not going to be a party to anything that would prevent our people from knowing how to guard against them.

THE SOCIETY OF PUBLIC ANALYSTS is holding its annual general meeting on Wednesday, March 4, at the Chemical Society's Rooms, Burlington House, London. The ordinary monthly meeting will follow and arrangements have been made for members and their friends to dine together informally at St. James's Restaurant, 178, Piccadilly, in the evening.

GERMAN POTASH EXPORTS in 1930 amounted to 995,000 tons, or 8,700 tons less than in the previous year, their value being £339,000 lower at £3,012,000. Exports to Poland dropped by £327,000 to only £92,000. Holland was Germany's best customer, taking potash to the value of £573,000, while Great Britain occupied seventh place with £130,000, or £17,000 less than in 1929.

THE "GOLD MAKER," Franz Tausend, who is stated to have swindled a number of people out of nearly £100,000, in connection with a "gold making" process, was at Munich last week sentenced to three years and eight months' imprisonment of which twenty months have already been served in awaiting trial. The court confiscated the material used by Tausend in committing his frauds, including the gold found in his possession.

THE WELLCOME FOUNDATION LTD. is about to erect a new medical and chemical research building at the corner of Gordon Street and Euston Road, London, on the site, 225 feet by 135 feet, now partly occupied by their Bureau of Scientific Research. During many years the Foundation has maintained medical and chemical research laboratories, but recent developments have made it necessary to co-ordinate and extend these activities. Mr. Septimus Warwick, F.R.I.B.A., is the architect.

AN ORDINARY SCIENTIFIC MEETING of the Chemical Society will be held on Thursday next at Burlington House, London, when the following papers will be read: "A new method for the preparation of organo-thallium halides," by F. Challenger and B. Parker; "The dissociation of salts in nitrobenzene," by W. F. K. Wynne-Jones; and "The formation of acyl-chloroamines from hypochlorous acid," and "The direct interchange of chlorine in the interaction of p-toluenesulphonamide and N-chloroacetanilide," both by D. R. Pryde and F. G. Soper.

Obituary

MR. JOSIAH MILES, instrument designer at the Welsh School of Medicine and Chemistry, aged 71. He had devoted the whole of his working life to the designing of instruments for scientific research.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

339,589. DYE INTERMEDIATES. E. F. Bangham, L. J. Hooley, J. Thomas and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, June 4, 1929.

Halogenated phthalic acids, salts or anhydrides are condensed with halogenated phenols in sulphuric acid or oleum with boric acid or borax to obtain anthraquinone derivatives with hetero-nuclear halogen substituents. Examples are given of the condensation of *p*-chlor-phenol with 4-chlor-phthalic anhydride, acid potassium 4-chlor-phthalate, acid potassium 3 : 4-dichlor-phthalate, 3 : 4-dichlor-phthalic anhydride and 4 : 5-dichlor-phthalic anhydride, and the condensation of 2 : 4-dichlor phenol and *o*-chlor phenol with 4 : 5-dichlor phthalic anhydride or acid. The products are chlorinated quinizarins and alizarins.

339,592. ABSORBING OLEFINES IN SULPHURIC ACID. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschapij, 30, Carel Van Bylandtlaan, The Hague. Application date, August 6, 1929.

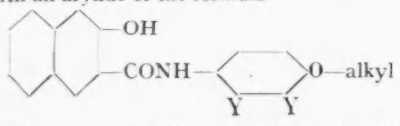
Cyclic hydrocarbons with one double bond are absorbed in sulphuric acid, *e.g.*, of 80 per cent. strength, in the presence of catalysts described in specifications Nos. 323,748, 336,603-4 and 336,633 (see THE CHEMICAL AGE, Vol. XXII, p. 249, Vol. XXIII, pp. 577 and 578), and the products hydrolysed or distilled to obtain alcohols, esters, or ethers. An example describes the treatment of cyclo-hexene, employing ferricyanic acid as catalyst and cooling with solid carbon dioxide. The mixture is poured into ice, alkali added, and the cyclohexanol distilled.

339,608. ELECTROLYSIS. Imperial Chemical Industries, Ltd., Millbank, London, and F. L. Clark, Winnington Hall, Northwich, Cheshire. Application date, September 7, 1929.

An alkaline suspension of ilmenite is electrolysed at 20 atmospheres pressure of hydrogen at a temperature of 90°–120° C. with an insoluble anode of carbon, nickel, or chromium steel to deposit iron and other impurities. In another case, ilmenite may be heated with solid caustic soda or sodium carbonate and the mixture electrolysed in suspension in caustic soda solution. The sludge of titanium dioxide, or sodium titanate, is washed, dissolved in sulphuric acid, and the solution treated for the production of pigments.

339,620. DYES. W. W. Groves. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 10, 1929. Addition to 336,938. (See THE CHEMICAL AGE, Vol. XXIII, p. 626).

Insoluble azo dyes are obtained by coupling a diazo, tetrazo or diazoazo compound free from COOH, SO_3H and OH groups with an arylide of the formula



where one Y represents hydrogen and the other OCH_3. The dyes may be made in substance or on the fibre, *e.g.*, cotton is impregnated with 2^1 : 3^1-oxynaphthoyl-4-amino-1 : 2- dimethoxy-benzene and developed with diazotised 2 : 5-dichloraniline. A number of other diazo compounds are specified.

339,626. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 8, 1929.

2 : 2^1-Dimethyl-1 : 1^1-dianthraquinonyls or 2 : 2^1-dimethyl-*ms*-benzo- or naphtho-dianthrones in which the hydrogen atoms of both methyl groups are partly or wholly replaced by halogen, are treated with acid or alkaline condensing agents having a reducing action and capable of splitting off halogen or hydrogen halide, *e.g.*, condensing agents to which reducing agents have been added, or compounds acting as reducing or condensing agents. Acid condensing agents such as sulphuric acid, oleum, and chlor-sulphonic acid may be mixed with copper, aluminium or zinc, cuprous oxide, cuprous halide, or metal sulphides. Alkaline condensing agents such as alkali or alkaline earth hydroxides, alkali carbonates or acetates, may be mixed with hydrosulphites, hydrazine, hydroxylamine, alkali or alkaline earth metal sulphides. Condensing agents which also have a reducing action include pyridine, hydrazine hydrate, phenyl hydrazine, aniline, dimethyl-amine, ethanol-amine, cyclohexylamine. The products are 2 : 2^1-ethylene–1 : 1^1-dianthraquinonyls, allo-*ms*-naphtho-dianthrones, and *ms*-anthra-dianthrones, and the products may be halogenated. The starting materials may be obtained by halogenating the 2 : 2^1-dimethyl-1 : 1^1-dianthra-quinonyl or 2 : 2^1-dimethyl-*ms*-benzo- or naphtho-dianthrones in organic solvents or suspending agents. In an example ω : ω^1-tetrabromo-2 : 2^1-dimethyl-1 : 1^1-dianthraquinonyl is treated with caustic soda solution and sodium hydrosulphite to obtain 2 : 2^1-ethylene-1 : 1^1-dianthraquinonyl which dyes cotton orange-yellow shades. The same compound may also be treated with an acid condensing agent and a reducing agent. Other examples describe the treatment of tetrabromo-2 : 2^1-dimethyl-*ms*-benzdianthrone containing the bromine in part of the nucleus, 4 : 4^1-dichlor-ω : ω^1-tetrabromo-2 : 2^1-dimethyl-1 : 1^1-dianthraquinonyl and ω : ω^1 tetrachlor- 2 : 2^1- dimethyl-*ms*- naphtho-dianthrone.

339,645. POROUS MATERIALS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 5, 1929.

Finely-divided metals or metal oxides are formed into a foam with a liquid such as water or alcohol, and a foam producing agent such as sulphonic acids of alkylated aromatic hydrocarbons or their salts, saponin, soaps, sulphuric esters or their salts, and the foam is then dried to form a porous mass. Porous oxides of iron, chromium, manganese, nickel, cobalt, copper or zinc may be converted into porous metals by reduction with hydrogen, etc. The size of the pores may be modified by blowing air or gas into the mixture and binding agents may be added. Masses prepared from colloidal iron oxide may be used as catalysts or as carriers for catalysts. The porous masses may be activated by treating the surface with acids, halogens, etc., and they may also be impregnated with other catalysts. In an example, porous copper or iron coated with magnesia or alumina may receive a precipitate of carbon, and is then suitable for use in the production of acetic acid from acetaldehyde. The porous metal obtained from iron powder, aluminium powder and potassium nitrate may be used in the synthesis of ammonia.

339,659. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 8, 1929.

ms-Naphtho-dianthrones, allo-*ms*-naphtho-dianthrones and *ms*-anthra-dianthrones are nitrated in the presence of diluents such as mono, di- and tri-chlorbenzene, bromo-benzene or quinoline. The nitro group or groups in the products may be replaced by halogen by treating with halogen or agents which split off halogen. In an example, allo-*ms*-naphtho-dianthrone is treated with nitric acid in nitrobenzene to obtain mono- and di-nitro derivatives. Concentrated nitric acid yields a tetra-nitro derivative. *ms*-Naphtho-dianthrone may be treated with a mixture of nitric and sulphuric acids to obtain a mono-nitro derivative which may be reduced with alkaline reducing agents to the mono-amino derivative. Several other examples are given.

339,675. FATTY ACID DERIVATIVES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 11, 1929.

Halogenated fatty acids with more than eight carbon atoms and which may contain hydroxy groups, and be saturated or unsaturated, are treated with a solution of ammonia in an organic solvent in the presence of copper or a copper compound. Carboxy-amides are first formed, and esters when alcohols are

present. The halogen atoms are replaced by amino groups and also may be split off with formation of double bonds. The products can be saponified by hot alkalies and have soap-like properties. In an example, hexachlor-ricinoleic acid is heated under pressure with a solution of ammonia in ethyl alcohol. A mixture of a chlorinated unsaturated fatty acid and a carboxy-amide is first formed, and then a mixture of an ester with a carboxy-amide or an inner salt formed by amino and carboxylic groups. Other examples describe the products obtained from hexa-chlor-stearic acid and a chlorinated linoleic acid.

339,727. VINYL HALOGENIDES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 7, 1928.

Gaseous halogen hydrides are treated with acetylene at a temperature of 180° C. employing as catalyst active carbon from which the activating agent has been removed, or active carbon prepared by the use of phosphoric acid and still containing it.

Specifications Accepted with Date of Application

341,847. Electrolysis with mercury electrodes under pressure, Apparatus for—for the manufacture of hydrogen peroxide. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 20, 1929.

341,881. Mixed crystal pigments, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 16, 1929.

341,882. Hydrocarbons, Method of and apparatus for treating. E. C. D. Yarmett. September 17, 1929.

341,884. Brominated vat dyestuffs of the benzanthrone series, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 21, 1929.

341,889. Copper-containing alloys, Treatment of. W. Kroll and Huttenwerke Trotha Akt.-Ges. October 20, 1928.

341,902. Benzoic acid, Manufacture of. H. E. Potts. (*Monsanto Chemical Works.*) August 21, 1929.

341,905. Derivatives of carbazole, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) September 14, 1929.

341,907. Steel alloys. Nitralloy, Ltd. October 9, 1928.

341,912. Nitrogenising alloy-steel articles. R. Sergeson. October 18, 1929.

341,915. Refining iron or steel. F. Krupp Akt.-Ges. Friedrich-Alfred-Hutte. June 18, 1929. Addition to 317,373.

341,926. Homogenous halogen derivatives of α-chloro-naphthalene, Manufacture of. I.G. Farbenindistrie Akt.-Ges. October 24, 1928.

341,961. Lactic acid or esters of lactic acid, Manufacture of. Imperial Chemical Industries, Ltd., and W. R. H. Hurtley. October 25, 1929.

341,969. Monoazo dyestuffs, Manufacture of. Major and Co., Ltd., H. H. Hinchliffe, and W. J. Darby. October 25, 1929.

341,970. Derivatives of 3-nitro-4-hydroxy-benzamide, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). October 25, 1929.

341,997. Merthenes, Manufacture of. Schering-Kahlbaum Akt.-Ges. November 15, 1928.

342,010. Hydrogenation of pyridine, quinoline, and homologues thereof. Schering-Kahlbaum Akt.-Ges. November 29, 1928.

342,022. Alkylene derivatives from alkylene oxides, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). November 11, 1929.

342,034. Heat treatment of hydrocarbon gases. Soc. d'Etudes et Realization Dite Ereal. November 3, 1928.

342,068. Concentrated nitric acid, Preparation of. N. Caro and A. R. Frank. December 6, 1928.

342,107. Polymerising hydrocarbons of the butadiene series. I. G. Farbenindustrie Akt.-Ges. January 9, 1929.

342,119. Extraction of formic acid from the residual lye from the purification of cellulose. Pateteries Navarre. November 30, 1929.

342,140. Iron compounds and chlorine, Production of. S. I. Levy and C. W. Gray. January 31, 1930.

342,152. Light metal alloy. Birmingham Aluminium Casting (1903) Co., Ltd., and P. Pritchard. February 7, 1930.

342,160. Ammonium sulphate, Production of. Patentverwertungs Akt.-Ges. Alpina. February 11, 1929.

342,174. Anhydrous aluminium chloride free from iron, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). February 27, 1930.

342,194. Aqueous dispersions of organic substances, Production of. Dunlop Rubber Co., Ltd., and Anode Rubber Co., Ltd., April 20, 1929.

342,202. Catalytic oxidation of ammonia. Selden Co. March 22. 1929.

342,208. Pure anhydrous aluminium chloride, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). March 26 1930.

342,235. Metals and their alloys, Protection of. C. F. Boehringe and Soehne Ges. May 21, 1929.

342,242. Adsorption of gases. Soc. l'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, and Soc. Chimique de la Grande Paroisse Azote and Produits Chimique. June 17, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Brown, J., and Courtaulds, Ltd. Manufacture of acetic anhydride. 3,300, 3,301. February 2.

Caro, N., and Frank, A. R. Production of calcium carbide and phosphorus. 3,739. February 5. (Germany, February 7, 1930.)

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of carbozole compounds. 3,504. February 3.

—— Manufacture of isocyanates. 3,569. February 4.

—— Manufacture of sulphonated conversion products of higher paraffin hydrocarbons. 3,780. February 6. (September 11, 1929.)

—— Manufacture of conversion products of higher paraffin hydrocarbons. 3,867. February 6.

—— Manufacture of conversion products of colophony. 3,963. February 7.

Davies, J. S. H. Vulcanisation of rubber. 3,499. February 3.

Dymock, J. B., and Stanley, H. M. Manufacture of aliphatic alcohols and ethers. 3,651. February 5.

Erfurt, E. Recovering oil from aqueous emulsions thereof. 3,622. February 5.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of acetic anhydride. 3,827. February 6.

Holmes and Co., Ltd., W. C. (Klar und Entphenolungsges.). Purification of phenol-containing liquors. 3,931. February 7.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of metal carbonyls. 3,304. February 2.

—— Manufacture of liquid unsaturated hydrocarbons. 3,305. February 2.

—— Refining oils. 3,847. February 6.

—— Manufacture of dimethylol urea. 3,848. February 6.

—— Manufacture of siccatives. 3,849. February 6.

—— Manufacture of conversion products of rubber. 3,850. February 6.

—— Manufacture of N-substituted alkylene diamines. 3,851. February 6.

—— Production of lacquers and articles coated therewith. 3,953. February 7.

—— Production of firmly adherent electrically insulating coatings. 3,954. February 7.

I.G. Farbenindustrie Akt.-Ges. Manufacture of alkamines. 3,284. February 2. (Germany, January 31, 1930.)

—— Bleaching flax, hemp, etc. 3,348. February 2. (Germany, February 26, 1930.)

—— Bleaching flax, hemp, etc. 3,427. February 3.

—— Measuring thickness of insulating coatings and linings. 3,693. February 5. (Germany, February 5, 1930.)

—— Manufacture of acid wool dyestuffs. 3,870. February 6. (Germany, February 8, 1930.)

Imperial Chemical Industries, Ltd. Separation of liquid particles from steam, etc. 3,312. February 2.

—— Vulcanisation of rubber. 3,499. February 3.

—— Steel-frame buildings. 3,500. February 3.

—— Calcium sulphate plaster mixes, etc. 3,575. February 4.

—— Plaster and cement mixes, etc. 3,576. February 4.

—— Bomb-dropping apparatus for aircraft. 3,751. February 6.

Joshua, W. P. Manufacture of aliphatic alcohols and ethers. 3,651. February 5.

Lefebure, V. Calcium sulphate plaster mixes, etc. 3,575. February 4.

—— Plaster and cement mixes, etc. 3,576. February 4.

Pontet, H. D. Internally-heated intermittent vertical retorts for distillation of shales, lignites, etc. 3,611. February 5.

Rohm and Haas Akt.-Ges. Manufacture of polymerised organic compounds. 3,240. February 2. (Germany, February 1, 1930.)

Schering-Kahlbaum Akt.-Ges. Fertilisers, etc. 3,567. February 4. (Germany, February 10, 1930.)

Standard Oil Development Co. Production of low-boiling hydrocarbons from heavier hydrocarbons. 3,812. February 6. (United States, March 7, 1930.)

United Water Softeners, Ltd. (Permutit Akt.-Ges.). Manufacture of base-exchange materials. 3,322. February 2.

—— and Permutit Co. Purification of water. 3,323 February 2.

White, A. E., and Nichols Copper Co. Treating sulphide ores. 3,830. February 6.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, February 11, 1931.

THERE has been a fair amount of activity in chemical markets during the current week and there is no change of any importance in prices to report. Export business is a little better.

General Chemicals

ACETONE.—Continues steadier at £60 to £65 per ton, according to the quantity, with the demand of fair volume.

ACID ACETIC.—Active at £36 5s. to £38 5s. per ton for Technical 80% and £37 5s. to £39 5s. per ton for pure 80%.

ACID CITRIC.—In only small demand and the price continues steady at about 1s. 1½d. to 1s. 2d. per lb., less 5%.

ACID FORMIC.—Firm at £38 5s. per ton for 85% Technical and in fairly good request.

ACID LACTIC.—Uncharged at £41 to £42 per ton for 50% by weight Pale quality and there is a fairly good demand.

ACID OXALIC.—Firm at £30 7s. 6d. to £32 per ton, according to quantity, and there has been a good demand.

ACID TARTARIC.—There is no change at 1s. 0½d. to 1s. 1d. per lb., less 5%, according to quantity and the demand is mainly for small parcels.

SULPHATE OF ALUMINA.—Firm at £7 15s. to £8 5s. per ton for 17/18% iron free quality.

ARSENIC.—The market continues firm at about £19 to £19 10s. per ton with early delivery still a little difficult.

CREAM OF TARTAR.—Unchanged at 87s. 6d. per cwt., ex warehouse London.

COPPER SULPHATE.—In rather better request at about £22 to £22 10s. per ton, less 5% free on rails London.

FORMALDEHYDE.—Steady at £30 10s. to £31 per ton.

LEAD ACETATE.—A further slight reduction in price is reported with white quoted at £34 5s. and brown at £33 5s. per ton.

LEAD NITRATE.—In small request at £29 10s. per ton.

LITHOPONE.—Unchanged at £18 to £22 per ton, according to grade and quantity.

POTASH BICHROMATE.—Firm at 4¼d. per lb., with usual discounts for contracts.

PERMANGANATE OF POTASH B.P. NEEDLE XTALS.—5½d. per lb., and in regular demand.

PRUSSIATE OF POTASH.—Very firm at £63 10s. to £65 10s. per ton, according to quantity, with an active demand.

SODIUM BICHROMATE.—Firm at 3½d. per lb., with usual discounts for contracts.

SODA CHLORATE.—Continues active at about £26 10s. per ton, with the market very firm.

SODIUM HYPOSULPHITE COMMERCIAL.—Quoted at £8 10s. per ton, with photographic crystals at £14 5s., and there is a fairly good demand.

SODIUM SULPHIDE.—Steady at £10 5s. to £11 5s. per ton for solid, and broken quality £1 per ton extra, carriage paid.

TARTAR EMETIC.—Quiet at about 11d. per lb.

ZINC SULPHATE.—Steady at £11 to £11 10s. per ton.

Coal Tar Products

THE market for coal tar products still remains inactive. There is nothing fresh to report and prices remain unchanged.

MOTOR BENZOL.—Quoted at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Unchanged at about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL.—Worth about 3d. to 3½d. per gallon f.o.r. in the north, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Unchanged at 1s. 8d. per gallon for the 98/100% quality, and at 1s. 6d. per ballon for the dark quality 95/97%.

NAPHTHALENES.—Remains at £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Quoted at 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast port.

THE following additional prices have been received :—

Phenolphthalein.—The scale of prices have been reduced as from February 9 and now reads : 10 cwt. lots, 5s. per lb. ; 2 cwt. lots, 5s. 1d. per lb. ; less, 5s. 2½d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The market continues quiet and prices are unchanged at £7 to £7 2s. 6d. per ton f.o.b. U.K. port in single bags, for neutral quality 20·6 per cent. nitrogen. *Home.*—Despite bad weather in the North, there is a slightly better demand, and it is anticipated that between now and the end of the month merchants will commence purchasing for their farmers' requirements. The price in operation from now until the end of June is £19 10s. per ton, delivered in 6-ton lots to consumers' nearest station.

NITRATE OF SODA.—The market for this product continues quiet.

Latest Oil Prices

LONDON, February 11.—LINSEED OIL was firm, and 2s. 6d. to 5s. per ton higher. Spot, ex mill, £18 10s. ; February to April £17 5s. ; May-August, £17 17s. 6d. ; and September-December, £18 5s., naked. RAPE OIL was inactive. Crude extracted, spot, £29 ; technical refined, £30 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £17 ; refined common edible, £21 ; and deodorised, £23, naked, ex mill. TURPENTINE was steady. American, spot, 37s. 9d. ; March-April, 38s. 3d. ; Russian, spot, 35s. per cwt.

HULL.—LINSEED OIL, naked, closed for spot at £17 ; February, £16 17s. 6d. ; March, £16 17s. 6d. ; May-August, £17 5s. ; September-December, £17 12s. 6d. ; Baltic, spot, unquoted. COTTON OIL, naked, Egyptian, crude, spot, £17 ; technical, spot, £19 5s. ; edible, refined, spot, £19 10s. ; deodorised, £21 10s. CASTOR OIL, spot, 39s. 6d. ; firsts, 34s. 6d. ; seconds, 32s. 6d. PALM KERNEL OIL, crude, naked, 5½ per cent., spot, £23. GROUNDNUT OIL, crushed/extracted, spot, £23 10s. ; deodorised, £27 10s. SOYA OIL, crushed/extracted, spot, £18 15s. ; deodorised, £22 10s. RAPE OIL, crushed/extracted, spot, £28 10s. ; refined, spot, £30 10s. per ton. COD OIL, 19s. per cwt. TURPENTINE, 39s. 6d. per cwt.

Weekly Chemical Prices

PRICES of British Chemical Products quoted in our last issue (Pp. 127 and 128) remain unchanged except for the following slight alterations :

ACID CRESYLIC.—99/100, 1s. 9d. to 1s. 10d. per gallon.

TOLUOLE.—90%, 1s. 8d. to 1s. 9d. per gall. Pure, 1s. 10d. to 1s. 11d. per gallon.

PRYIDINE.—90/160, 3s. 3d. to 3s. 6d. per gallon.

SODIUM BENZOATE B.P.—1s. 6d. per lb. for 1-cwt. lots.

South Wales By-Products

PITCH continues to have a slow, sporadic market, supplies being well in excess of demand. Values are unchanged. Road tar has a steady, but moderate, call at about 13s. per 40-gallon barrel. Refined tars continue to be the best feature, both coke oven and gasworks tar having a fair, steady call with values unchanged. Solvent naphtha is in poor call, while there is practically no call for heavy naphtha. Patent fuel and coke exports are slow and unsatisfactory. Patent fuel prices, for export, are :—21s. to 21s. 6d., ex-ship Cardiff ; 20s., ex-ship Swansea and Newport ; coke prices are :—Best foundry, 34s. to 36s. 6d. ; good foundry, 22s. 6d. to 25s. ; furnace, 17s. 6d. to 18s.

Scottish Coal Tar Products

A LITTLE more interest is being taken in certain products but, on the whole, conditions are unchanged, with supply greater than demand.

Cresylic Acid.—The turnover has increased during the week, but prices are unchanged. Pale, 99/100%, 1s. 6½d. to 1s. 7½d. per gallon ; pale, 97/99%, 1s. 5½d. to 1s. 6½d. per gallon ; dark, 97/99%, 1s. 4½d. to 1s. 5½d. per gallon ; high boiling, 1s. 7d. to 1s. 9d. per gallon, all ex makers' works.

Carbolic Sixties.—Value remains nominal at about 1s. 6d. to 1s. 8d. per gallon for best qualities.

Creosote Oil.—There is fair activity and prices continue steady. Specification oil, 2½d. to 2¾d. per gallon ; gas works ordinary, 3¼d. to 3½d. per gallon ; washed oil, 3d. to 3¼d. per gallon ; all f.o.r. in bulk.

Coal Tar Pitch.—Very few orders are being placed Export value is nominal at 42s. 6d. per ton f.a.s. Glasgow and home value is easy at 45s. per ton ex works.

Blast Furnace Pitch.—Quiet, with controlled prices at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Competition remains keen, but value has settled down at 2¾d. to 3d. per gallon ex works for forward delivery.

Blast Furnace Tar.—Dull at 2¾d. per gallon f.o.r.

Crude Naphtha.—Supplies are scarce and price is steady at 4½d. to 4¾d. per gallon.

Water White Products.—There is only a moderate demand. Motor benzol is 1s. 4d. to 1s. 4½d. per gallon ; 90/160 solvent, 1s. 2½d. to 1s. 3½d. per gallon ; 90/190 heavy solvent, 1s. 0½d. to 1s. 1d. per gallon, all in bulk quantities f.o.r. makers' works.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, February 10, 1931.

STEADILY increasing inquiries are reported in the Scottish heavy chemical market.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3¼d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11¾d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2¼d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £28 per ton, ex wharf. On offer for shipment from China at about £27 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £22 10s. per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £22 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £8 10s. per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £34 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 7s. 6d. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums. £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums. £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £10 per ton, carriage paid, buyer's sidings, minimum six-ton lots.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £19 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Laboratory Tragedy at Bolton

Analytical Chemist and Assistant Found Gassed

MR. Haigh Campbell (69), a Bolton analytical chemist, trading under the name of Harcourt Phillips, and his assistant, Mr. Leslie Tootill (22) were both found fatally gassed at Mr. Campbell's laboratory on Monday night. It appears that at the time Mr. Campbell was conducting an experiment in his laboratory with some unknown chemical substance which he had heated in a crucible. An analysis of the residue found in the crucible has been made by the Bolton Borough Analyst, Mr. H. Hurst, and his report will be given at the inquest which was formally opened on Wednesday and adjourned until Wednesday next.

It is understood that the laboratory book, which is in the possession of the Bolton police, will reveal the nature of the substance from which the gas fumes arose. The last entry, which is in Mr. Campbell's handwriting, gives a certain formula which the police assume to be that of the substance he was experimenting with at the time of his death. It is believed that the substance became overheated and threw off deadly fumes which overcame the two men before they had time to reach the outer door.

French Linseed Oil Position

To enable them to meet foreign competition French producers of linseed oil have appealed to the Government for an increased duty on the imported product of at least 15 francs per 100 kilos. French prices dropped continually last year and fell from 555 francs per 100 kilos in 1929 to 345 francs in November last. The principal cause of the sharp downward movement is that it is almost impossible for French manufacturers to operate on a profitable basis on account of the keen competition afforded by Belgium, which is the main supplier of linseed oil to France. It is reported that the greater part of the linseed oil which is imported into France from Belgium, and sold at extremely low prices, originates in Russia.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, February 12, 1931.

Apart from the adverse effects of the cotton trade lockout, of which no sign of a settlement is yet in sight, there seems a slight tendency for things to improve a little, enquiry having been on a somewhat better scale during the past week. The bulk of the chemicals that are being sold are for comparatively early delivery, and individual orders are not for important quantities. Users would appear to have little to gain by holding off merely from the point of view of prices, for in most instances these are well held.

Heavy Chemicals

Offers of bichromate of soda are on a steady basis and a moderate demand has been reported this week; values are at 3½d. per lb., less 1 to 2½ per cent., according to quantity. There has been little quotable change in the position of phosphate of soda, though only a quiet business is being put through at round £10 per ton for the dibasic material. Caustic soda is moving off in fair quantities against contracts, and prices are firm at from £12 15s. to £14 per ton, according to grade. A moderate amount of inquiry is about in the case of bicarbonate of soda and quotations are steady at £10 10s. per ton, in contracts. Prussiate of soda this week has been in limited request, but offers of this material are well held at from 4¾d. to 5¼d. per lb., according to quantity. Alkali keeps steady at round £6 per ton, and a moderate amount of buying interest is being shown. A quiet trade is passing in saltcake, quotations for which are still in the neighbourhood of £3 per ton. The demand for chlorate of soda during the past week has been on a moderate scale, with no alteration in the price position, values being at from £26 per ton. Sulphide of sodium is reasonably steady at the moment, although not a great deal in the way of business is being put through; the 60–65 per cent. concentrated solid quality is at round £10 per ton and the commercial grade at £8 10s. Hyposulphite of soda meets with a quiet demand at about £15 per ton for the photographic material and £9 5s. for the commercial.

Taking the potash products generally, little real sign of weakness is to be observed. Yellow prussiate maintains a firm front, with offers ranging from 6¾d. to 7¼d. per lb., according to quantity. Permanganate of potash is selling in moderate quantities, with offers of the B.P. quality at round 5½d. per lb. and of the commercial at 5¼d. Carbonate of potash keeps reasonably steady, with moderate sales reported at about £25 per ton. Inquiry for chlorate of potash is on quiet lines at £27 10s. per ton. Caustic potash continues to be quoted here at up to £29 per ton, fair sales being done. Bichromate of potash meets with a quietly steady demand, and values are held at 4¼d. per lb., less 1 to 2½ per cent.

Supplies of arsenic are still not excessive, and the firmness in this section is well maintained, current quotations being at from about £19 per ton, at the mines, for white powdered, Cornish makes. Only a comparatively quiet call is reported in the case of sulphate of copper, prices of which are unchanged at £21 per ton, f.o.b. A moderate business is going through in the acetates of lead at from £33 17s. 6d. to £35 15s. per ton for white, and £33 10s. to £34 15s. for brown, according to quantity. Nitrate of lead is unchanged, and is still hovering between £29 and £29 10s. per ton. Acetate of lime is slow and easy in tendency at round £7 5s. per ton for the brown material, and £14 for the grey.

Acids and Tar Products

Acetic acid is firm and in fair request at about £37 per ton for the commercial 80 per cent. quality, and £51 for the glacial. The demand for both citric and tartaric acid is only on very moderate lines, but there has been no further change in prices, which are at round 1s. 2d. and 11½d. per lb. respectively. With regard to oxalic acid, the demand for this is quiet, but values remain at about £1 12s. per cwt., ex store.

New business in pitch is not extensive, and at 40s. per ton, f.o.b., or less values are not too strong. Creosote oil is in moderate request at from 3¼d. to 4¼d. per gallon, naked, at works. Carbolic acid is practically neglected, and prices are weak at 1s. 2d. to 1s. 3d. per gallon, naked, for crude, and round 5d. per lb., f.o.b. for crystals. Solvent naphtha is rather quiet at 1s. 2d. per gallon.

Company News

Staveley Coal and Iron Co.—An interim dividend of 6d. per share, free of tax, is announced, payable on March 31.

English China Clays, Ltd.—A dividend is announced on the cumulative preference shares, at the rate of 7 per cent. per annum for the half-year ended December 31, 1930, payable on February 2.

Boran Consolidated, Ltd.—The directors have announced that they are unable to recommend the payment of any dividend on the preferred or deferred ordinary shares in respect of the year to September 30 last.

Blundell, Spence and Co.—For the year to October 31 last the report shows a debit balance of £3,459. With the amount brought forward there is a net credit of £4,488. Income tax and preferred divided absorbed £10,663, leaving a net debit of £6,175, which the directors have transferred from reserve. The annual meeting will be held on February 19.

Horace Cory and Co.—The report for the year 1930 states that the profit was £3,335, to which is added £419 brought forward, making a total of £3,754. The directors recommend that payment of the dividend on the ordinary shares be passed, and that the balance of £1,005 be carried forward. The annual meeting will be held on February 26 at 12.30 p.m., at Winchester House, London.

Dr. G. C. Clayton on Trade Conditions

The Advantages of Widnes

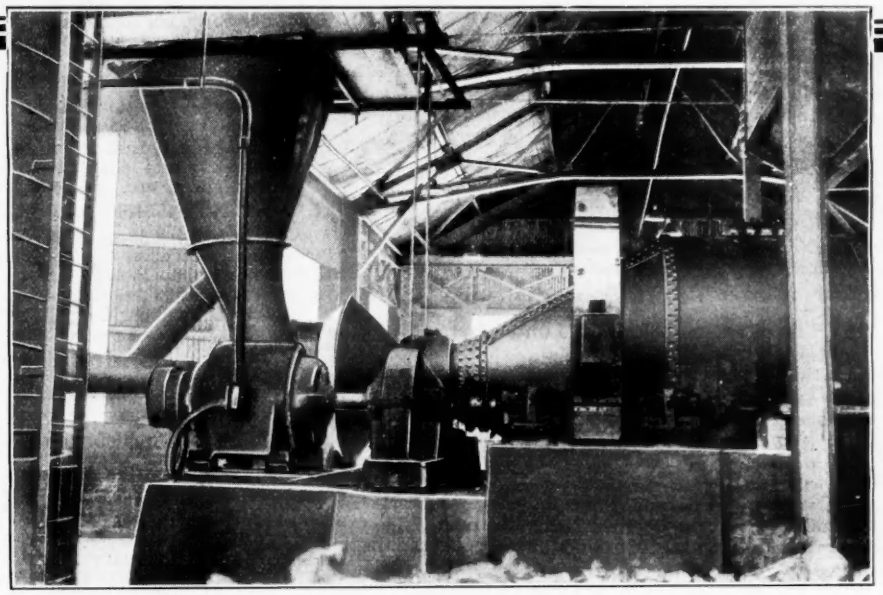
Dr. G. C. Clayton, deputy-president, was in the chair at the annual meeting of Widnes Chamber of Commerce and gave a review of the general trade position. "I wish I could say," he stated, "that our industrial depression had reached the bottom, but attending, as I do, the meetings of the Advisory Council of the Board of Trade, I hear the reports of the representatives of all industries in the country—I myself represent the chemical industry at these meetings—and they certainly do not point to immediate recovery. Against this, I believe that recovery, when it does come, will be rapid, and a shortage in one product will probably induce buyers in other industries to cover their requirements.

"Widnes, being a provider of the raw material of other industries, has necessarily been suffering in company with other districts, and it would certainly have had further unemployment if the Dyestuffs Act had been allowed to lapse. We have to thank the House of Lords for this benefit. I am glad to hear on all sides emphasis laid on the advantages Widnes undoubtedly possesses as a manufacturing centre. Instead of the tendency to be pessimistic about the future, I would like to say that the attitude is growing among all the people that I meet that Widnes has great advantages, and we have no intention of ignoring them when the question of development goes forward. There is no doubt that Widnes is receiving favourable consideration in all cases of future development, not only by Imperial Chemical Industries, but also by other firms, and when the present depression passes I have every confidence that Widnes will share in the prosperity which I feel we, as a nation, may still hope to enjoy."

Irish Free State Kelp Industry

The progress of the Irish Free State Government's scheme for the production of iodine from kelp is now being carried a stage further and the factory at Galway is producing a fertiliser from the kelp after the iodine has been extracted. This fertiliser is reported to contain approximately 20 per cent. of pure potash and 2 per cent. of nitrogen. The Irish farmers are becoming more and more used to the idea of chemical manures and it is expected that there will be a keen demand for the supply of about 2,000 tons of this fertiliser when it is placed on the market. The interest which the Irish agriculturist is taking in chemical fertilisers is in the main due to the work of the County Agricultural Committees which have been formed under the Government's supervision to give advice to farmers on all points relating to their stock and lands. The chemical companies have also assisted considerably by arranging demonstration lectures in various centres throughout the country. These lectures are generally well attended and the trading results of the companies concerned show that the money spent in this way is earning a satisfactory return.

Built with an enormous capacity for hard work



We can give you expert service and advice on Grinding, Pulverising, Screening, Classifying, Filtering and associated equipment.

THE Hardinge Conical Pebble Mill has a high output coupled with maximum grinding efficiency on a low power consumption.

With a silex lining, materials can be ground so that no discoloration or iron contamination occurs. It also grinds either wet or dry and delivers either granular or to an impalpable product.

SPECIFIC INSTANCE OF HARDINGE PERFORMANCE

One 8 ft. × 48 ins. Hardinge Conical Pebble Mill, together with a 6 ft. superfine air classifier, is grinding 2,200 lbs. per hour of silica to 92%-95%—325 mesh, the feed being 30 mesh.

MINING & INDUSTRIAL EQUIPMENT LTD.
ASSOCIATED WITH — INTERNATIONAL COMBUSTION LTD.
11, Southampton Row, London, W.C.1.
Works: Derby & Erith.

TELEPHONE: HOLBORN 7277 (3 LINES)
TELEGRAMS & CABLES: HARDRAYMIL WESTCENT LONDON

HARDINGE MILL

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the registration of the following trade marks can be lodged up to February 28, 1931.

ABRACOL.

517,528. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. A. Boake, Roberts and Co., Ltd., 100, Carpenters Road, Stratford, London, E.15; manufacturing chemists. November 6, 1930. To be associated with No. 363,979 (1912) and another. (By consent.)

EMULTRIN.

518,639. Class 4. Raw, or partly prepared, vegetable, animal, and mineral substances used in manufactures. The Limmer and Trinidad Lake Asphalt Co., Ltd., Artillery House, Artillery Row, Westminster, London, S.W.1; manufacturers. December 12, 1930.

DULUX.

518,823. Class 4. Oils, turpentine and turpentine substitutes, all being raw or partly prepared substances for use in manufactures. Nobel Chemical Finishes, Imperial Chemical House, Millbank, London, S.W.1; manufacturers. December 18, 1930.

Opposition to the Registration of the following Trade Marks can be lodged up to March 4.

WHEELER'S.

492,402. Class 1. Woodfillers, being goods for sale in Great Britain. E. I. Du Pont de Nemours and Co. (a corporation organised and existing under the laws of the State of Delaware), 1007, Market Street, Wilmington, State of Delaware, United States of America; manufacturers. June 14, 1928. Advertised before acceptance, the applicants alleging distinctiveness.

GLYPSOL.

516,626. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. October 4, 1930.

DULUX.

518,169. Class 1. Paints, enamels (in the nature of paints), lacquers, japans, varnishes, distempers and paint driers. Nobel Chemical Finishes, Ltd., Imperial Chemical House, Millbank, London, S.W.1; manufacturers. November 27, 1930.

LOLED.

518,929. Class 1. Zinc oxide. Newcastle-upon-Tyne Zinc Oxide Co., Ltd., Mitchell Street, Birtley, Co. Durham; manuacturers. December 22, 1930.

LITTLE SECRET.

519,228. Class 1. Mineral dyes. The United Indigo and Chemical Co., Ltd., Union Buildings, Chapel Walks, Manchester; chemical manufacturers. January 6, 1931.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

DANZIG.—An agent desires to represent British firms for the sale of shellac and glue, or would purchase for his own account. (Ref. No. 112.)

EGYPT.—The Department of Public Health is calling for tenders, to be presented in Cairo by April 16, for the supply of drugs, etc., the specification for which covers proprietary articles, drugs and chemicals, galenicals and packed articles. (Ref. No. F.X. 1,026.)

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

DICK'S ASBESTOS CO., LTD., London, E.C. (M., 14/2/31.) Registered January 27, mortgage, to National Provincial Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 70 and 74, Stephenson Street, Canning Town, etc. *£9,761. December 31, 1930.

NORTH BRITISH ARTIFICIAL SILK, LTD., London, E.C. (M., 14/2/31.) Registered February 2, bond, etc., collaterally securing £40,000 under debenture dated December 23, 1930, to Williams Deacon's Bank, Ltd., securing all moneys due or to become due to the Bank; charged on certain property at Jedburgh. *Nil. October 23, 1930.

London Gazette, &c.

Company Winding Up

LEWIS JAMESON AND CO., LTD. (C.W.U., 14/2/31.) Winding-up order, February 2.

Companies Winding Up Voluntarily

BRITISH PHOTOGRAPHIC RESEARCH ASSOCIATION. (C.W.U.V., 14/2/31.) Creditors' claims to A. D. Wykes, of 67, Watling Street, London, E.C.4, the liduidator of the company, by February 25.

DENNY CHEMICAL ENGINEERING CO., LTD. (C.W.U.V., 14/2/31.) By special resolution, February 6. C. S. Goddard, F.C.A., of Arthur Goddard and Co., 46-47, London Wall, London, E.C.2, appointed liquidator of the company.

GYPSUM AND PLASTER PRODUCTS CO., LTD. (C.W.U.V., 14/2/31.) Creditors' claims by April 6 to F. T. Smith, of 150, Southampton Row, W.C.1, liquidator of the company.

New Companies Registered

H. BEECHER WARD, LTD.—Registered February 10. Nominal capital, £1,000 in £1 shares. Wholesale or retail consulting, analytical, manufacturing, pharmaceutical and general chemists, herbalists and seedsmen, etc. Directors: Mrs. Agnes M. Ward, 572, Hessle Road, Hull, H. Beecher Ward.

SHEPPERSON FERTILISER CO., LTD. Registered February 6. Nominal capital £100 in £1 shares. Seed, bone and shell crushers, manufacturers of sulphuric acid, chemical, fish, bone and artificial manures, insecticides, fungicides, and feeding stuffs, manufacturing chemists, etc. Directors: L. W. Smith, Burton House, Lincoln; F. G. C. Fison.

ZOCUS COMPOSITIONS AND PAINT CO., LTD., 17, Gracechurch Street, London, E.C.3. Registered February 4. Nominal capital, £5,000 in £1 shares. To acquire the undertaking, assets and goodwill of the business of the Zocus Paint Co., Ltd., and all trade marks connected therewith, and to carry on the business of manufacturers and importers of and dealers in chemical, industrial and other preparations and articles, oils, paints, dyes, pigments, etc. Directors: P. Boundy, W. L. L. Grant, D. L. Grant.

Continental Bromine Agreement

THE agreement which has just been signed between the German bromine syndicate and the French producers is very like that concluded at the end of 1929 between the German potash syndicate and the Alsace mines. The French bromine production has grown considerably of recent years, and is expected to pass the 1,000-ton mark in 1931.